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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

SECOND SESSION

ON

S. 2355

AUTHORIZING APPROPRIATIONS FOR FISCAL YEAR 1989 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 6
STRATEGIC FORCES AND NUCLEAR DETERRENCE

FEBRUARY 29; MARCH 1, 18, 22, 25, 31; APRIL 12, 15, 18, 1988

Printed for the use of the Committee on Armed Services

U.S. GOVERNMENT PRINTING OFFICE
85-272 WASHINGTON : 1988

S201-6

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CONTENTS

CHRONOLOGICAL LIST OF WITNESSES

TACTICAL NUCLEAR FORCES MODERNIZATION

FEBRUARY 29, 1988

Page
Lehman, Hon. Ronald F., II, Assistant Secretary of Defense for International Security Policy, accompanied by Brig. Gen. Frank A. Partlow, Jr., U.S. Army, Joint Chiefs of Staff Representative to the INF talks; and Maj. Gen. Martin J. Ryan, U.S. Air Force, Director of Force Structure, Resources, and Assessment Directorate, Joint Chiefs of Staff ... 3

STRATEGIC DEFENSE INITIATIVE (SDI)

MARCH 1, 1988

Herres, Gen. Robert T., Vice Chairman, Joint Chiefs of Staff ... 53
Abrahamson, Lt. Gen. James A., Director, Strategic Defense Initiative Organization ... 73

U.S. STRATEGIC DETERRENCE

MARCH 18, 1988

Chain, Gen. John T., Jr., Commander in Chief, Strategic Air Command, and Director, Strategic Target Planning ... 107

ABM SYSTEMS COMPLIANT WITH THE ABM TREATY

MARCH 22, 1988

Morning Session

Hofferth, Dean D., director of the High Endoatmospheric Interceptor Program, McDonnell-Douglas Astronautics Co ... 147
Loomis, William C., director of ground-based defense systems, Lockheed Missiles & Space Co., accompanied by Kenneth A. Fisher, manager of advanced systems, Lockheed Missiles & Space Co ... 172
Cahn, Dr. Anne H., director, Committee for National Security ... 193

ICBM MODERNIZATION PROGRAMS AND STRATEGIC WARNING INDICATORS

MARCH 22, 1988

Afternoon Session

May, Brig. Gen. Charles A., U.S. Air Force, Deputy Director of Strategic Special Operations Forces and Airlift Programs ... 238
Welch, John, Assistant Secretary of the Air Force for Acquisition ... 255

Page

AIR FORCE REVISED SPACE LAUNCH PROGRAM AND POLICY

MARCH 25, 1988

Aldridge, Hon. Edward C., Jr., Secretary of the Air Force, accompanied by Gen. Thomas Moorman, Director, Air Force Space and SDI Programs 266
Myers, Dale D., Deputy Administrator, National Aeronautics and Space Administration 294

DEPARTMENT OF ENERGY ATOMIC ENERGY DEFENSE ACTIVITIES

MARCH 31, 1988

Herrington, Hon. John S., Secretary, Department of Energy, accompanied by Troy E. Wade II, Acting Assistant Secretary for Defense Programs, Department of Energy, and Dr. Robert Barker, Assistant to the Secretary of Defense for Atomic Energy Programs, Department of Defense 329
Wade, Troy E., II, Acting Assistant Secretary for Defense Programs, U.S. Department of Energy, accompanied by Dr. Robert Barker, Assistant to the Secretary of Defense for Atomic Energy, U.S. Department of Defense 357

CHEMICAL WEAPONS MODERNIZATION AND DEMILITARIZATION PROGRAM

APRIL 12, 1988

Welch, Dr. Thomas, Deputy to the Assistant to the Secretary of Defense for Atomic Energy, accompanied by Col. Robert Orton, U.S. Army, Program Manager, Binary Weapons; Capt. Larry Pfitzenmaier, U.S. Navy, Program Manager, Bigeye Chemical Bomb; and Dr. Dee Ritchie, Directorate of Operational Test and Evaluation 547
Shannon, Hon. John W., Assistant Secretary of the Army for Installations and Logistics, accompanied by Brig. Gen. David Nydam, Program Manager, Chemical Demilitarization 580

CIVIL DEFENSE PROGRAM

APRIL 12, 1988

Becton, Hon. Julius W., Jr., Director, Federal Emergency Management Agency, accompanied by Grant Peterson, Associate Director, State and Local Programs and Support; and Hon. Craig Alderman, Deputy Under Secretary of Defense for Policy 608
Alderman, Hon. Craig, Deputy Under Secretary of Defense for Policy 625

B-1B TEST PLAN AND PROGRAM

APRIL 15, 1988

Hall, Maj. Gen. Michael D., Director of Strategic, SOF, and Airlift Programs, Assistant Secretary of the Air Force (Acquisition), Department of Defense, accompanied by Brig. Gen. Robert E. Dempsey, Deputy Chief of Staff, Strategic Planning and Analysis, Strategic Air Command 647
Krings, Hon. John E., Director of Operational Test and Evaluation 665
Woodruff, Dr. Lawrence, Deputy Under Secretary of Defense for Acquisition (Strategic and Theater Nuclear Forces) 667

PACE AND DIRECTION OF THE STRATEGIC DEFENSE INITIATIVE, AND COMPLIANCE WITH THE ABM TREATY

APRIL 18, 1988

Costello, Dr. Robert B., Under Secretary of Defense for Acquisition, and DOD Cognizant Official for Compliance of DOD RDT&E Activities with U.S. Legal Obligations 679
Abrahamson, Lt. Gen. James A., Director, Strategic Defense Initiative Organization 701
Index ..... (i)

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

MONDAY, FEBRUARY 29, 1988

U.S. Senate,
Subcommittee on Strategic Forces
and Nuclear Deterrence,
Committee on Armed Services,
Washington, DC.

TACTICAL NUCLEAR FORCES MODERNIZATION

The subcommittee met in executive session, pursuant to notice, at 2:10 p.m., in room S-407, the Capitol, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Levin, Kennedy, Glenn, Warner, Thurmond, Quayle, and Wilson.

Staff present: Romie L. Brownlee, deputy staff director for the minority; Robert G. Bell, Robert F. Bott, Brian D. Dailey, Sherri Wasserman Goodman, William E. Hoehn, Jr., George K. Johnson, Jr., Ronald P. Kelly, and T. Kirk McConnell, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Milton D. Beach, assistant to Senator Glenn; Terrence Lynch, assistant to Senator Shelby; James M. Bodner, assistant to Senator Cohen; Henry D. Sokolski, assistant to Senator Quayle; and Mark J. Albrecht, assistant to Senator Wilson.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator Exon. The subcommittee will please come to order.

I understand Senator Thurmond is on his way and will be here in just a few moments, and he may have an opening statement. We will go ahead with the opening statements now.

We meet today to receive testimony on the tactical nuclear force modernization issues in support of our markup for the fiscal year 1989 defense authorization bill. Our first witness today is Hon. Ronald F. Lehman, Assistant Secretary of Defense for International Security Policy, and a man well known to this committee and very well considered by this committee.

Ambassador Lehman is accompanied by Maj. Gen. Martin Ryan and Brig. Gen. Frank A. Partlow from the organization of the Joint Chiefs of Staff.

Gentlemen, our committee has already heard testimony from many, many witnesses on the INF Treaty and its implications for NATO. Most of that testimony has supported the view that modernization of our theater nuclear capabilities was required before—

and I emphasize, before—the two-track decision was confirmed by the Montebello Decision while negotiations were ongoing.

And now that the treaty has been signed, modernization will still be needed. While Pershing II and GLCM were part of that modernization, there are other ongoing modernization programs as well.

The second point on which administration witnesses have agreed has been that compensation for U.S. INF withdrawals is not required. That is, we need to continue the nuclear modernization program, but we do not need to start new programs or expand ongoing ones.

Finally, I should note that, although most of the INF delivery systems and all of the warheads are U.S. systems, we must continue to coordinate carefully with our allies about the pace and scope of nuclear modernization.

Ambassador Lehman, we look forward to receiving your testimony momentarily.

I would like to now ask the other members of the subcommittee if they have opening statements. Senator Thurmond has just come in the door. While he is being seated, I will ask Senator Kennedy if he has an opening statement.

Senator KENNEDY. No statement, Mr. Chairman.

Senator EXON. Senator Glenn.

Senator GLENN. I have no opening statement. I look forward to the testimony.

Senator EXON. Thank you very much, gentlemen.

I will be pleased to recognize my friend and colleague from South Carolina, the ranking member of the committee, Senator Thurmond, for any opening statements or remarks that you have as we begin our deliberations.

Senator THURMOND. Thank you very much. Thank you, Mr. Chairman.

I want to join in welcoming our witnesses this afternoon. Secretary Lehman is of course well known to this subcommittee, and it is with great pleasure that we see him for the first time officially in his new position.

I also want to extend my appreciation to the representatives from the Joint Chiefs of Staff for joining us today on what has necessarily been very short notice.

Mr. Chairman, I also extend my congratulations to you in stepping out smartly on hearings that will be required in review of the fiscal year 1989 defense authorization request.

This subcommittee, by virtue of its important responsibilities in strategic and tactical nuclear programs and space programs, has annually held two to three times more hearings than any other subcommittee. Such will be the case again this year, and I again look forward to working with you and the staff as we build the record necessary for making recommendations to the full committee.

Mr. Chairman, the topic of tactical nuclear modernization is a very timely one, coming as it does as we near the completion of the full committee hearings on the INF Treaty.

I think it is important, however, that we do not think of the INF modernization as somehow linked to the treaty. The tactical nuclear modernization program has been ongoing for some time and has been strongly supported by this committee.

The need to continue this program will be unaffected by the prospects for the INF Treaty. Indeed, our hearings over the past month have highlighted the significant imbalances that exist between the Warsaw Pact and NATO, both in conventional forces and in tactical nuclear forces, a point that emphasizes the need for continued modernization.

I hope that this afternoon's hearing will afford an opportunity to do the following: First, to provide a perspective on the alliance decisions that have supported the ongoing modernization programs;

Second, to provide a perspective on the threat and on the requirements that SACEUR generated as a result of analysis conducted after the Montebello Decision;

Third, to provide a description of the tactical nuclear programs that are included in the fiscal 1989 amended budget request;

Fourth, to provide an indication of the effect of congressional constraints on tactical nuclear modernization, and especially when the programs will be adversely impacted by the constraints;

And fifth, to provide a perspective on the alliance consultation and decision process with respect to modernization initiatives in the post-INF period.

Mr. Chairman, I look forward to hearing the testimony of our distinguished witnesses on this important topic. Thank you, Mr. Chairman.

Senator EXON. Thank you, Senator.

Obviously, we are in secret classification and all should be advised accordingly.

This is a highly important meeting. It is going to set, I think, the course for the Armed Services Committee on authorization procedures and what should and should not be done. So it is very important that we have the understanding of our top military and administrative input to guide us as we work through these very complicated things.

I thank you for being here today, Mr. Ambassador. I know that this was the last day that you could testify and we were pleased to change our schedule to accommodate you, because we just felt it was a must that we have your input.

Would you proceed, please.

STATEMENT OF HON. RONALD F. LEHMAN II, ASSISTANT SECRETARY OF DEFENSE FOR INTERNATIONAL SECURITY POLICY, ACCOMPANIED BY BRIG. GEN. FRANK A. PARTLOW, JR., U.S. ARMY, JOINT CHIEFS OF STAFF REPRESENTATIVE TO THE INF TALKS; AND MAJ. GEN. MARTIN J. RYAN, U.S. AIR FORCE, DIRECTOR OF FORCE STRUCTURE, RESOURCES, AND ASSESSMENT DIRECTORATE, JOINT CHIEFS OF STAFF

Ambassador LEHMAN. Thank you very much, Mr. Chairman. I appreciate your flexibility on the scheduling and I hope that today's hearing will be very helpful.

I have a longer statement which I would ask be introduced for the record and I will make a shorter statement.

Senator **Exon**. Without objection, it will be included in the record.

Ambassador **Lehman**. I am honored to appear here always, but I am very honored to appear before this subcommittee, with which I was associated for so many years.

The subject of our theater nuclear forces and non-strategic nuclear forces is very timely. There have been a number of developments in Europe and the United States which have made this a very topical subject.

First, the signature of the INF Treaty in December has highlighted the importance of moving forward with NATO's previously established plans to modernize its remaining nuclear forces in Europe.

Second, the prospect of NATO's INF missiles being removed from Europe has led to an unfounded concern among many individuals in one key allied country that that country would bear a disproportionate share of the burden and risk of NATO's remaining nuclear deterrent.

Third, long-term factors independent of the INF Treaty, including both the aging of existing systems and the evolution in Warsaw Pact forces, require the United States to continue to pursue in earnest a number of key nuclear modernization programs in support of the alliance.

I recently had the opportunity, along with several distinguished members from this committee, to attend the Wehrkunde Conference in Germany. By the end of the conference, a clear consensus had emerged around several points:

First, NATO's strategy of flexible response remains valid and necessary.

Second, this strategy must continue to be supported by modern and effective NATO nuclear forces in Europe. The alliance strategy cannot be denuclearized.

And third, the so-called third zero, the negotiated elimination of short-range missiles or missiles and artillery, is unacceptable because it would undermine flexible response and lead to the denuclearization of Europe.

And fourth, failure by NATO to modernize would result in an even less palatable result, a unilateral third zero.

I would like to talk about the importance of modernization, placing it in the context of NATO's long-term approach to ensuring our collective security. Greater detail can be found in my classified written testimony, which I have asked to be put in the record.

There has been much discussion recently about NATO's Montebello Decision, what was agreed and what remains to be done. It is probably worthwhile to describe briefly what the decision entailed.

In October 1983 at Montebello, Canada, NATO Defense Ministers in the Nuclear Planning Group agreed that modernization of NATO's nuclear forces in Europe would permit a reduction by 1,400 warheads. They accordingly identified a number of measures to improve NATO's nuclear capabilities and asked General Rogers, then SACEUR, to elaborate upon these measures in developing recommendations on how to implement the Montebello Decision.

General Rogers provided his recommendations to the Nuclear Planning Group at its March 1985 meeting in Luxembourg. These recommendations involved withdrawal of weapons, modernization of remaining systems, redistribution of remaining systems within Europe, and improvements to their survivability and command and control.

Modernization requirements envisioned by Defense Ministers at Montebello and elaborated by SACEUR included development and deployment of a follow-on system to replace the aging Lance, a tactical air-to-surface missile to replace a portion of the bombs for NATO aircraft, and modern 8-inch and 155-millimeter nuclear artillery rounds to replace older rounds.

The requirements also included continued modernization of NATO's dual capable aircraft and their bombs.

The Montebello Decision and the requirements flowing from it have provided NATO with a long-term and coherent program to ensure the deterrent capability of one leg of the NATO triad, its non-strategic nuclear forces in Europe.

This program is intended to allow NATO to maintain a credible deterrent at a minimum level of weapons into the next century. Failure to modernize would undercut the basis for the significant reductions in weapons that were part of the Montebello Decision.

The Montebello program remains valid following the signature of the INF Treaty. In the communique for the most recent meeting of the Nuclear Planning Group, NATO Defense Ministers emphasized that they remained "determined, consistent with the framework of the Montebello Decision and with our arms control obligations, to continue to implement those measures required to maintain the effectiveness, responsiveness and survivability of our nuclear forces."

The reductions agreed to at Montebello have been completed. In conjunction with an earlier reduction by 1,000 warheads, NATO has reduced its inventory of nuclear weapons in Europe by over one-third since 1979. Atomic demolition munitions and Honest John rockets have been removed from Europe and the Nike-Hercules surface-to-air missile is being replaced by the conventional Patriot.

The numbers of short-range systems and air-delivered bombs have been reduced. The inventory now stands at the lowest level in 20 years, although many of the weapons in it were introduced in the 1970s, the 1960s, and even the 1950s.

Implementation of the INF Treaty will result in further reductions, removing some of the most modern weapons. With respect to modernization of the remaining inventory, progress has been made in varying degrees. Programs are under way to modernize NATO's existing stockpile of air-delivered bombs as well as the aircraft that deliver them.

The United States has introduced a modern 8-inch artillery round and is developing a new 155 millimeter round. The Department of Defense is considering several candidate systems for follow-on to Lance and has requested funding to initiate the development process.

Congressional restrictions prohibit utilization of the Army tactical missile system in this role, despite the fact that this is a promising option.

Finally, the Department of Defense is considering various candidates for a tactical air-to-surface missile to be deployed by the mid-1990s.

While not part of the Montebello Decision or SACEUR's 1985 recommendations, the United States is proceeding with its program to deploy the nuclear variant of the Tomahawk land-attack missile on a variety of surface ships and submarines. This program adds importantly to our worldwide deterrent capability and may also provide important capabilities to NATO after the withdrawal of the INF missiles.

In addition to modernization, the United States and NATO are moving forward to improve nuclear force survivability. An important program in that regard is the weapons storage and security system for air-delivered weapons. NATO is seeking early certification of eligibility for NATO infrastructure funding, as stipulated by Congress.

General Ryan will provide more programmatic details on these systems, and we will be talking to you later this year about congressional restrictions.

In assuming my current position in the Department of Defense, I also assumed the chairmanship of the advisory group whose recommendations provided the basis for the Nuclear Planning Group's Montebello Decision. At our meeting earlier this month, it was clear to me that NATO countries remain committed to that decision.

The United States and its allies have already undertaken important steps in implementing the Montebello program. The next steps do not require a new alliance decision or actual deployment decisions by our allies in the next few years.

Both the tactical air-to-surface missile and the follow-on to Lance will not be available for deployment until the mid-1990s. The United States must now move these systems beyond the drawing board before individual allies can determine exactly how they will participate.

The allies expect and want leadership from the United States in the area of nuclear forces. We must demonstrate to the alliance and to the Soviet Union that we will take the steps necessary to provide for our security. The alliance has a long-term coherent program for that purpose. It deserves unified support from the executive and legislative branches, both now and into the next decade.

Both the 1979 Dual-Track Decision and the 1983 Montebello Decision were part of the alliance's comprehensive concept for ensuring its security at a minimum level of weapons.

U.S. leadership underpinned the alliance's solidarity and determination that led to the treaty, vindicating NATO's Dual-Track Decision.

Mr. Chairman, I hope today that we can demonstrate for you that we do have a comprehensive program, a coherent program. It is a program that is constantly under review, but it is a sound program nevertheless.

Thank you, Mr. Chairman.

[The prepared statement of Ambassador Lehman follows:]

PREPARED STATEMENT OF ASSISTANT SECRETARY LEHMAN

U.S. non-strategic nuclear forces (NSNF) have worldwide missions, although the bulk are concentrated in western Europe. This statement focuses on their role in Europe and on the U.S. modernization programs necessary to support NATO.

Three factors have converged recently to make NSNF modernization an important topic of discussion both here and in Europe. First, signature of the INF Treaty in December 1987 has highlighted the importance of moving forward with NATO's previously-established plans to modernize its remaining nuclear forces in Europe. Second, the prospect of NATO's INF missiles being removed from Europe has led to an unfounded concern among many individuals in one key Allied country that it will bear a disproportionate share of the burden and risk of NATO's remaining nuclear deterrent. Third, long-term factors independent of the INF Treaty, including both the aging of existing systems and evolution in the threat, have moved the United States to the point where it must begin to pursue in earnest a number of key nuclear modernization programs in support of the Alliance.

THE MONTEBELLO DECISION

In October 1983 at Montebello, Canada, NATO Defense Ministers in the Nuclear Planning Group [NPG] agreed that NATO's nuclear inventory in Europe could be reduced by 1,400 warheads if the remaining nuclear force were fully modernized. Deployment of PERSHING II and GLCM, to begin later that year, would not undercut this net reduction, since it was agreed that one additional warhead would be removed for each INF missile warhead introduced.

In order for this minimum force to be a credible deterrent, Defense Ministers agreed on the need to ensure that the remaining warheads and their delivery systems are responsive, survivable, and effective. They further agreed that the Alliance must undertake the necessary actions to improve its forces across the entire spectrum of capabilities. The Defense Ministers accordingly identified a number of measures to improve NATO's nuclear capabilities and asked the Supreme Allied Commander, Europe [SACEUR] to elaborate upon these measures in developing recommendations on how to implement the Montebello Decision.

[Deleted.]

SACEUR provided his recommendations to the NPG at its March 1985 meeting in Luxembourg. These recommendations were developed as part of his 1985 Nuclear Weapons Requirements Study (NWRS-85) and involved withdrawal of weapons, modernization of remaining systems, redistribution of remaining systems within Europe, and improvements to their survivability and command and control.

Specific modernization programs [deleted] include:

—modernization of NATO's dual-capable aircraft (DCA) [deleted].

—replacement of a portion of the bombs for U.S. and Allied DCA [deleted] with a tactical air-to-surface missile (TASM) [deleted] to enhance penetrativity against Warsaw Pact air defenses;

—replacement of the aging LANCE missile system fielded with U.S. and Allied forces [deleted] with a follow-on system with a range of [deleted] improved accuracy and responsiveness, and [deleted] to increase survivability; and

—complete modernization of NATO's 155mm and 8-inch nuclear artillery rounds, allowing older rounds to be completely replaced on a less than one-for-one basis.

[Deleted.]

The Montebello Decision and the requirements flowing from it have provided NATO with a long-term and coherent program to ensure the deterrent capability of one leg of the NATO "triad"—its non-strategic nuclear forces in Europe. This program is intended to allow NATO to maintain a credible deterrent at a minimum level of weapons into the next century. Failure to modernize would eliminate the basis for the significant reductions in weapons that were part of the Montebello Decision.

The Montebello program remains valid following signature of the INF Treaty. In the Communique from the November 1987 NPG meeting in Monterey, NATO Defense Ministers emphasized that they remain "determined, consistent with the framework of the Montebello Decision and with our arms control obligations, to continue to implement those measures required to maintain the effectiveness, responsiveness, and survivability of our nuclear forces."

[Deleted.]

STATUS OF MONTEBELLO IMPLEMENTATION

The reductions agreed to at Montebello have been completed. In conjunction with an earlier reduction by 1,000 warheads, NATO's European inventory of nuclear weapons has been reduced by over one third since 1979. Atomic demolition munitions and Honest John rockets have been removed from Europe, and the Nike Hercules surface-to-air missile is being replaced by the conventional Patriot. The numbers of short-range systems and air-delivered bombs have been reduced. The inventory now stands at the lowest level in twenty years, although many of the weapons in it were introduced in the 1970s, the 1960s, and even the 1950s. Implementation of the INF Treaty will result in further reductions, removing some of the most modern weapons.

With respect to modernization of the remaining inventory, progress has been made—in varying degrees.

NATO's existing stockpile of air-delivered bombs continues to be modernized [deleted]. This program increases the overall safety, security, and effectiveness of the bomb stockpile. NATO's DCA are being modernized through continued procurement of the F-16 and Tornado, through upgrades to the United States F-111, and through U.S. [deleted].

The United States has introduced the modern 8-inch W79 artillery round and is developing the new 155mm W82. However, the congressional cap on production of modern artillery rounds will require that a significant number of older rounds be retained despite their lower deterrent capability in Soviet eyes and despite the fact that they lack modern safety and security features.

The Department of Defense is considering several candidate systems for the FOTL and has requested funding to initiate its development. Congressional restrictions prohibit utilization of the Army Tactical Missile System (ATACMS) in this role, despite its obvious benefits in terms of cost, force structure, survivability, and Allied acceptability. [Deleted] have noted the advantages inherent in utilizing the Multiple Launch Rocket System (MLRS)—the launcher for ATACMS—as the launcher for the FOTL.

Finally, the Department of Defense is considering various candidates for a TASM to be deployed by the mid-1990s. [Deleted.]

While not part of the Montebello Decision or SACEUR's NWRS-85 recommendations, the United States is proceeding with its program to deploy the nuclear variant of the Tomahawk land-attack missile (TLAM/N) on board a variety of U.S. surface ships and submarines. This program adds importantly to our worldwide deterrent capability and may also provide important capabilities to NATO after the withdrawal of INF missiles. [Deleted.]

In addition to those activities for moderization of nuclear weapon systems, the DoD and NATO have moved forward to improve the storage and survivability of the nuclear weapons deployed in Europe. The INF Treaty focuses increased attention on DCA and steps are under way to improve DCA survivability with such programs as the Weapon Storage and Security System (WS^3) which provides weapon storage vaults in hardened aircraft shelters. WS^3 has been strongly supported by NPG Ministers, SACEUR, and nations. Recently, the NATO Military Committee unanimously endorsed the Military Operational Requirement (MOR) for WS^3 and sent the following message to SHAPE:

[Deleted.]

Further, SHAPE and NATO Headquarters are working on a shortcut procedure to obtain eligibility for NATO infrastructure funding as stipulated by the Congress.

THE WAY AHEAD

The United States and its allies have already undertaken important steps in implementing the Montebello program. The next steps do not require a new Alliance decision or actual deployment decisions by our allies in the next few years. Both the TASM and FOTL will not be available for deployment until the mid-1990s. The United States must now move these systems beyond the drawing board before individual Allied governments can determine exactly how they will participate.

The Allies expect and want leadership from the United States in this area. We must demonstrate to the Alliance—and to the Soviet Union—that we will take the steps necessary to provide for our security. The Alliance has a long-term, coherent program for that purpose. It deserves unified support from the executive and legislative branches both now and into the next decade.

Senator Exon. Thank you, Ambassador.

How do you wish to proceed? Do you suggest that we proceed to hear testimony from General Ryan and General Partlow now?

Ambassador **Lehman**. They have no prepared statements.

Senator **Exon**. I understand you do not have prepared statements. Do you have any general statements you would like to make, General Ryan?

General **Ryan**. No, sir, I do not have any general statement. I am here in the primary capacity to assist in answering any questions you all may have, and I believe the same is true of General Partlow.

General **Partlow**. The same with me.

Senator **Exon**. Let us begin the questions, then. And we will follow our usual 6-minute limit per round.

NUCLEAR ARTILLERY SHELLS

Mr. Ambassador, since the first 155 millimeter nuclear artillery shell is not to be delivered until [deleted] how do you characterize the current legislative restrictions on the number of nuclear artillery shells as constraining the program this year?

If not, when would the committee have to revisit the issue of additional production of the 155?

Ambassador **Lehman**. Mr. Chairman, if we make a decision to go beyond the level provided for by the cap, it would be more economical if we could have money in fiscal year 1990 to continue production, so that there will not be a break in the production line. It would be more cost effective.

The amount involved is about [deleted]. We have not yet requested that money. We understand that in order to actually produce nuclear artillery shells beyond the ceiling, we would have to come to the Congress. We have not yet asked the Congress for such legislation. We are still reviewing the matter.

But let me say that I believe it is likely that we will come to the Congress at some point and request that that legislation be altered.

Senator **Exon**. And you do expect that you, the administration, will be doing that this year some time?

Ambassador **Lehman**. Yes, sir.

Senator **Exon**. You said in the first part of your statement that one country—you did not name that country. Would you name that country just for the record?

Ambassador **Lehman**. Yes, the Federal Republic of Germany.

Senator **Exon**. What is your assessment of the strength of the opposition to this in the Federal Republic of Germany? I am looking at it from a political standpoint now, both from the standpoint of the present government and the opposition.

What would be your best judgment on the matter, given your experience over there?

Ambassador **Lehman**. I believe that the mainstream of thinking in the Federal Republic of Germany is that the nuclear deterrent is a vital part of the deterrent posture of the alliance and that this posture involves flexible response, nuclear forces of the United States in Europe, and short-range systems as well.

What the precise balance of systems should be I think is a matter under discussion. Most of the debate and discussion in the

Federal Republic right now is focused on the question of approaches to arms control and their relationship to deterrence in the post-INF environment.

My own view is that the debate in the Federal Republic is healthy and that as the debate goes on a view will emerge within the Federal Republic that will follow the traditional line of the importance of flexible response and a full spectrum of capabilities.

Indeed, my own reading of the recent Wehrkunde Conference was that it was a very, very useful and important meeting, because immediately after the signing of the INF Treaty there were a number of concerns about where the United States was headed, where the allies were headed, where the Soviet Union was headed, and what it all meant for deterrence and for American commitment to NATO.

I think that a lot of these issues were brought out in that conference. I found that by the end of the conference people began to see the basic validity of the alliance approach, especially the absolute necessity for maintaining flexible response and an American presence, including an American nuclear presence in Europe.

Senator EXON. Well, Mr. Ambassador, I think, based on what you have just said, .certainly would you agree with the general assessment that both Kohl and Woerner have been very ambiguous about their commitment to modernization?

As I understand it, there is growing support for the slogan of the opposition that says, the shorter the range the deader the Germans. Is that going to catch on? Or do you think that they are just marking time, trying to get their forces together so that they can do what is right and proper in this area?

Ambassador LEHMAN. Let me say that I have no doubts in my own mind that Chancellor Kohl or even his successors, and certainly also Minister Woerner, will do exactly what is right.

The saying that you mentioned is not catching on. I think it caught on for a while and now it is tending to recede, because I think that the more thoughtful people look at how it is that NATO keeps the peace, the more they recognize that the so-called singularity argument is a false argument.

Senator EXON. Are you saying, then, the Woerner and Kohl are more forthcoming in private discussions with the administration than they have been publicly?

Ambassador LEHMAN. Mr. Chairman, as you remember, Chancellor Kohl said in Wehrkunde that we must have flexible response, that we must have U.S. nuclear forces in Europe, that we cannot accept the third zero. And he has made it clear that a failure to modernize would in essence be a unilateral third zero.

In our discussions with him and with the members of his government, indeed all the members of his government, they have acknowledged that this is their policy.

I think the problem is that if we raise future options and force commitment on decisions for which there is not sufficient information at this time, that inevitably will lead to a certain political debate. One takes these steps as appropriate, based on the decisions that need to be made.

And I have every confidence that the Federal Republic of Germany will continue to do as it has been doing, that is to say support the types of steps necessary to maintain, including modernize, our theater nuclear forces.

Senator **Exon**. Thank you.

My time is up. Senator Thurmond.

Senator **Thurmond**. Thank you, Mr. Chairman.

IMMEDIATE MODERNIZATION COMMITMENTS

Secretary Lehman, recent press reports on the visit of Chancellor Kohl suggest that the United States agreed not to press the alliance for any immediate modernization commitments. Are these reports accurate, and if so what implications does this have for actions that this committee must take on the fiscal year 1989 amended budget request?

Ambassador **Lehman**. Senator Thurmond, I think there is a bit of a misunderstanding about the Montebello Decision or what I would like to call the Montebello process, because it is a process that is not about to begin; it is a process that has been under way since 1983.

It is not a process that is about to result in deployment; it is a process that has already resulted in deployment, and it is continuing to result in deployments. We have fielded a new 8-inch artillery round in Germany. We have completed that process.

We are continuing to introduce new air deliverable bombs. [Deleted]. And this is a process that is continuing.

In addition, [deleted] we will be looking at certain adjustments in our forces, sort of rearranging the furniture, as it has been described, that might be useful as a result of the INF Treaty.

And we are continuing the modernization. Specifically, we are continuing to work on the development of two systems that the alliance has been very much interested in: the so-called TASM, the tactical air-to-surface missile; and the follow-on to Lance. And this is all continuing.

REMOVING CONSTRAINTS

Senator **Thurmond**. Earlier administration testimony recommended legislation to remove the constraints on the nuclear artillery modernization program and on the Lance follow-on program. Does the reported U.S. commitment with Chancellor Kohl change the administration's position with respect to the urgency of removing those constraints?

Ambassador **Lehman**. No, sir, it does not.

MODERNIZATION INITIATIVES

Senator **Thurmond**. Secretary Lehman, could you outline for the committee the process by which modernization initiatives are approved both by the U.S. Government and by the NATO alliance?

Ambasador **Lehman**. Senator Thurmond, this committee knows the U.S. process better than I could ever describe it. We do develop systems for our own use, and let me give you an example. [Deleted].

Now, the alliance has expressed an interest since Montebello, reinforced numerous times at various levels, in the development and ultimately the deployment of a tactical air-to-surface missile. [Deleted].

Frankly, I think, while we continue within the alliance to discuss exactly what characteristics would be desirable for that system to have, in the end the allies will be looking to see what we think are the most viable candidates and what kind of programs we would recommend.

But I should point out that this is not simply a unilateral decision, nor is it necessarily a multilateral NATO level issue alone. [Deleted].

So you see, in the end we have to decide for ourselves, the executive branch and legislative branch working together, what we think is the appropriate American program or role. But it will be done with bilateral consultations with key allies and in the multilateral context as well, [deleted].

BUDGET REQUEST FOR TACTICAL NUCLEAR MODERNIZATION

Senator THURMOND. General Ryan, could you relate for the committee a description of the fiscal year 1989 budget request as it pertains to tactical nuclear modernization?

General RYAN. Well, sir, many of the items in the 1989 request have already been covered. I can cover several others with you.

The follow-on to Lance, we have asked for $15 million to study follow-on to Lance. We think it could cost as high as $600 million to approximately $1 billion. It is possible that we could use a variant of the Pershing II for that purpose.

The AFAPS, the artillery-fired projectile shell, we would need a release from the restriction to avoid the break in production, and we would need about $21 million in 1990 to continue that program. The total cost for [deleted] AFAPS would be about $214 million over about a 4-year period.

We will need to do some considerable improvement to weapons storage vaults in Europe, [deleted].

We are working with our NATO counterparts to secure the funding for those.

We will also have to do some considerable improvement to aircraft shelters, [deleted] 30 percent of which are U.S. funded and the remaining are NATO funded. The U.S. share of those shelters is approximately $100 million, [deleted].

The modernized bombs, the B-57, B-61, [deleted] in the stockpile needing replacement. And there are some other options or, as the chairman refers to it, moving around the furniture, which are still in the discussion mode at this time, that I am not prepared to discuss with you at this time.

I would be glad to take that question for the record and expand on that answer if you would like, sir.

Senator THURMOND. I wish you would do that.

General RYAN. Yes, sir.

[Additional information follows:]

Let me lay those out in general terms. I would add that funding for these options is not required prior to fiscal year 1990.

[Deleted.]

As I said, we have asked for $15M to study follow-on to Lance. This study will help us to determine the best option for development. For instance, if an ATACMS with a nuclear warhead is selected, costs would be about $600M [deleted]. If, on the other hand, a completely new system is selected, the cost could be in excess of $1.5B. Obviously, there are other factors to be considered which impact on cost over time such as use of existing hardware and facilities and manpower efficiencies.

For AFAPS, the artillery-fired atomic projectiles, we have requested $83M for the production of the W82s which are for the 155mm howitzers. If we are allowed to acquire modernized AFAPS above the current Congressional restriction [deleted] it would be most cost effective to obtain $21M in fiscal year 1990 to avoid a halt in production and those attendant costs.

We are also in the process of modernizing our air-delivered bombs. We have [deleted] the old B57 bombs which we are replacing with the B61 series (we will also be upgrading some of our earlier B61s). [Deleted].

We have [deleted] aircraft shelters planned for Europe [deleted]. We are doing this on a shared basis with the US providing 30 percent of the funding. [Deleted]. No funding will be required for fiscal year 1989 and we anticipate approximately $100M will be required for fiscal year 1990–97.

We also have [deleted] weapons storage vaults planned for Europe, [deleted]. We are currently awaiting NATO decisions on infrastructure funding so that we can determine the exact U.S. funding requirements. We anticipate $17.7M for fiscal year 1989 and $32.1M for fiscal year 1990–91.

There are some other options or, as the Chairman refers to it, moving around of the furniture, which are still in the discussion state with the allies.

Senator THURMOND. Mr. Chairman, my time is up.

Senator EXON. Thank you, Senator Thurmond.

Senator Kennedy.

Senator KENNEDY. Thank you very much, Mr. Chairman.

I just want to again recognize Ambassador Lehman coming before the committee. I think all of us who have had the opportunity to attend the observer group on various arms control issues have always found him enormously forthcoming and helpful to us all, and we very much appreciate the service he has provided to the country in that area and we are glad that he is continuing.

THIRD ZERO AND MODERNIZATION

There are two areas I would just like to cover. One is the third zero and the other is modernization. We talked about some of these issues with regard to the German response.

There have been reports that Mitterand was going to support a similar position, and I think many of us want to see, obviously, the modernization. There are the specific kinds of issues, primarily the Lance follow-on. Concerns have been expressed by both Harold Brown, Secretary Schlesinger about that type of modernization for that particular weapons system, believing that the ink is not even going to be dry on INF and here we are going in terms of a very significant modernization program on this.

And there is at least the argument that has been made—I know the chairman asked you about it—about the mood and atmosphere there, that even though there seems to be some lessening of the intensity of the debate and discussion, there has been a rather interesting different political alliance certainly in the Federal Republic.

And I can understand why the administration was willing perhaps to let the Chancellor not be quite as specific in his visits over here and not to raise some of these issues, for the reasons that I think you wisely outlined.

But I suppose the question is, with the continued administration position on the follow-on to Lance, whether that may very well trigger the kind of debate about the whole role of nuclear weaponry there and where we are going to come out on it, even the existing kinds of nuclear weapons that exist, and whether we may be finding ourselves in a more complicated and difficult position than just the issue of the Lance.

You have probably responded to that question already. I do not know if there is anything else you want to add to it, if you feel strongly, the administration does, about a more vigorous program on the Lance follow-up. But given what Harold Brown and Secretary Schlesinger have expressed about that, given the fact that Mitterand as well has talked about this, do you have any kind of hesitancy whatsoever, not in some of these other areas in terms of the modernization—obviously the artillery shells, and we will come back to the ATACMS in a minute.

But with that in mind, what kind of concerns do you have?

Ambassador LEHMAN. Senator Kennedy, I think I would like to address it just briefly. I think it is important to understand how this debate got started and how it evolved, because I am not so sure that the debate was ever as crisp and as clean as it needed to be.

One of the reasons I think the debate is beginning to recede is that people are beginning to understand what the issues are, and they are not necessarily the issues people were debating.

Remember that the issue really began with the emergence of the so-called second zero in conjunction with the first zero in INF. The question arose as to whether there could be a third zero, and within the Federal Republic of Germany there were many people who felt that the second zero was not necessarily a good thing for the alliance; that, while it required the Warsaw Pact to give up far, far more systems—in fact, we had none—that nevertheless the effect of it was to move down the path toward denuclearization, and the fear that the third zero would follow.

Senator KENNEDY. I want you to continue, but in your own understanding of the third zero, that does not include artillery shells, though, does it, or dual attack systems, in the third zero?

Because you talked about denuclearization, and if you understand that they are still going to permit artillery and dual attack—just so I understand where we are coming from.

Ambassador LEHMAN. It is not clear. The debate did not originally focus on artillery, but on short-range missiles. The third zero was then characterized as basically the rest of the short-range missiles.

Senator KENNEDY. Including artillery?

Ambassador LEHMAN. Not including artillery. However, as the debate evolved in Germany, more and more people spoke as if it meant the rest of the short-range systems, including artillery.

I think that the reason that the debate took the turn that it did was that, at a time when, following the Montebello Decision, we were talking about the ability to use longer-range short-range systems, if I can say that, to reduce the number of nuclear artillery by providing greater flexibility, accuracy, survivability, that suddenly it looked as if we were going to give away or negotiate away those systems, and that would only leave nuclear artillery.

So there were some people who followed that line of logic and expressed some concerns. This inevitably led to this debate over the so-called singularity issue. The singularity issue actually began back in 1979. It actually has a longer history, but in 1979 singularity really focused on a form of burdensharing. That is to say, that other people should take deployments too. But it always had a little bit of a notion of risk-taking or risk-sharing, as well.

But the debate that developed late last year focused almost predominantly on this risk aspect and the notion that if NATO's nuclear deterrent in Europe were to be almost entirely short-range systems, that the FRG would take a disproportionate burden.

I think what has emerged in Germany now is a greater recognition that in fact there is not much merit in the singularity argument, that if they want to stand up and say, we are the ones who will suffer, what about the Belgians, the Dutch, and all of the people who have the ports that are likely to be hit by longer-range systems that exist in any case?

And ultimately the real question, which is what about the United States? Does anyone believe that the United States is not at risk in extending the nuclear umbrella to Europe?

You remember the movie, "The Day After," and the implications for Kansas City. I think they have come to understand that, as far as nuclear issues go, we are all in this together.

So I think I would say that any responsible leader, when there is a public debate and there are fears, has to make sure that he handles those in a responsible way. But I see no reason to believe that Chancellor Kohl is not handling this in a responsible way, and I have every reason to believe that he knows what will be right and he will do what is right.

Senator KENNEDY. Mr. Chairman, if I could just have one point that the Ambassador said. Could I just follow up?

Senator EXON. Certainly.

Senator KENNEDY. On the short range, if we are going to exclude the narrow, and we can define those in terms of eliminating tactical, the artillery shells and dual capable, figuring that the Soviets are 14 to 1 as I understand it, 1,360 to 88, a 14 to 1 advantage over us within that range, why does it make sense to eliminate that as a possible area of trying to find further reduction if you still have the other kinds of artillery shells and you have the modernization of the SLCMs and the dual aircraft?

Ambassador LEHMAN. I think the answer is that, in terms of warheads, it is not clear exactly what that ratio is, but clearly they have a significant advantage. The verification issues in this area are very difficult.

It is true that we look to these systems as providing a part of the spectrum of options, and we think it is a very important one.

But candidly, there is also the question of whether they are really prepared to give up that kind of advantage. They did it in INF, but would they be prepared to do that with this even more extreme difference, without trying to extract unacceptable prices?

And would not the actual political impact of this kind of negotiation in essence be a negotiated denuclearization of Europe? In short, as you have seen in the conventional area, they still tend to want to get a handle on our dual capable aircraft.

Senator KENNEDY. Thank you, Mr. Chairman.

Senator EXON. Thank you, Senator Kennedy.

Senator Glenn.

Senator **Glenn**. Thank you, Mr. Chairman.

FORWARD DEFENSE CONCEPT

To know what we are doing in weapons buys, whether it is a Lance follow-on or whatever, we have to base that on the strategy we are pursuing. And I wonder if there is any reconsideration of that strategy? And I do not ask that facetiously at all.

We have pursued a forward defense concept for a long time because we supposedly do not have the in-depth forces to provide a conventional defense and contain an attack.

Every war game I have heard of has shown that there is not a single war game where we have tried this concept and it has done anything but be a disaster.

So I think maybe it might be in order to test the forward defense concept before we decide what weapons are going to be behind it. We have a couple of concepts, of course.

We hit their follow-on forces, their logistics tail, so they are somewhat cut off. But I think the cutting off of logistics tails, at least in past combat, has never been so complete that we would contain a war in Europe by that means.

And yet we know that in any situation, if you hammer away long enough with armored forces at a particular spot, you are going to break through. And if there is nothing behind it, it is just not much of a war from there on.

So when I read some of this information in the paper the other day, I wondered whether anyone is really talking to our allies about this situation, because for us to vote on your proposed weapons systems, they have to be based on a strategy. And the strategy looks like it is just as faulty as it could possibly be right now.

I know all the political reasons for this, with the German hesitancy about in-depth absorption of an attack. They do not want their country to get obliterated again.

But because they do not like that to say we will put everything up here in position and if there is a breakthrough the war is over. This is pretty hard to accept also. So is anyone looking at this issue again?

As far as I know, there has not been one single war game or maneuver that has shown this strategy to be anything but lousy. Correct me if I am wrong.

Ambassador **Lehman**. I will search to see if I can find a study to show you wrong.

Senator **Glenn**. I have not read one, either those in the paper or the ones I know about privately that have not been in the paper yet. Is anyone taking a second look at this thing?

Ambassador **Lehman**. Over the years we have constantly reviewed the strategy, both within NATO and in bilateral and multilateral study groups and internally. I will be very candid with you. I think the reason that we always come back to flexible response and forward defense is that it is a sound approach. It is a sound policy as a general guideline, and let me explain what I mean.

Flexible response says militarily that whatever strategy or tactic the enemy comes up with, we hope to have a credible means of stopping it, but if we fail we are prepared to escalate in a manner we choose. Therefore, you are not likely to succeed, but even if you have some military success the price is too high.

On the political side, as you know, flexible response basically is an effective way of dealing with exactly the singularity argument. We all lose if there is a war, so let us deter war by making sure that the Soviets cannot pick and choose among our weaknesses.

FOLLOW-ON FORCES ATTACK

Now, on forward defense—and I think that is the main thrust of your question—you are right. I mean, a major reason for forward defense is related to the fact that major Soviet forces threaten a key ally, the Federal Republic of Germany, up front. And they are concerned about all of their sovereign soil, every square inch.

For that reason, it is true that the tactics that we employ in Europe are somewhat different than the tactics the Army might employ somewhere else in the world, where you might have more room to maneuver.

But forward defense is important not solely to protect every square inch of German territory, although undoubtedly that is an important factor. Our backs are to the Atlantic. There is not a lot of maneuver room in central Europe. That is part of our problem.

If I could use the example of a boxer, a boxer likes to stand up straight on his feet so he can go forward and go back. He has the ability to maneuver. And if you apply that to central Europe, normal Army tactics would mean you would have the ability to fall back until such time as you were ready to move, but would also have the ability to go forward.

In Europe, what we are doing with follow-on forces attack—FOFA, as it is called—and related uses of technology and tactics is to be really like a boxer who is backing up toward the ropes, because in essence that is the situation in Europe.

But he leans forward in order to give himself some room to maneuver back. So in essence, what follow-on forces attack means is that we are leaning forward in order to take on the second echelon, to weaken the attack as we are hit.

What we do not want to be doing is to be leaning backwards, like a boxer on the ropes, because in Europe, if we are on the ropes and leaning backwards, we are in trouble.

So now in general what we like is forward defense with something like FOFA to take on the second echelon and give us some room out there. Do we ever change it? Yes. FOFA itself was a change.

As you know, originally there were certain political concerns that FOFA would look too aggressive, it would look like we were planning offensive approaches to the East that would be preemptive. But now people have come to recognize throughout Europe that this really is a much smarter way to try to deal with the threat of attack.

Are there other new ideas? We are looking at technologies for using in some cases conventional in lieu of nuclear weapons, to attack certain points in the rear echelon that we have not been able to attack effectively with conventional weapons before, in order to take the momentum out of their attack.

So I think we are still committed to forward defense, and for reasons that are not just political, but that obviously will evolve with technology and tactics.

That long question and response took up all your time.

Senator GLENN. No. I made a statement myself here. But I am very concerned about this, and I really think that every single war game we have tried, every single maneuver on the desert we have tried, everything that has been done under forward defense has not worked, and without exception as far as I know.

And so to stick politically with a system—and we can put all the right words to it, but to stick with a system that obviously is not likely to work in combat, it seems to me maybe we ought to pull back and reconsider some of this.

Senator EXON. Thank you, Senator Glenn.

We are going to have a second round, of course. Senator Quayle.

Senator QUAYLE. Thank you, Mr. Chairman.

FOLLOW-ON TO LANCE

I have just arrived and I have not read the entire statement, so let me try to just focus on a couple of things in the first two pages. Do you want to give me the procedure and the process we are going to follow to implement our follow-on to Lance, and where do we stand on that decision?

The reason I ask that is when I was in Europe recently—as a matter of fact, I think we almost crossed paths over there in Brussels—it was pointed out to me that part of the problem to getting a commitment to the follow-on to Lance rested in Washington, that Washington has not really clearly signed off on what they want to do, how they are going to do it, and what the schedule is going to be.

And I found that intriguing, because I was somewhat under the impression, although we do not have it in the developmental stage, the follow-on to Lance, that we are certainly proceeding in that direction.

But this was used as a reason for not going fast or not going too fast in forcing the Germans to accept modernization.

Where do we stand on the follow-on to Lance specifically? And do you give any credence to those who say, you know, part of the problem is that Washington has not told us exactly how they are going to develop and procure the follow-on to Lance, and they have not really resolved on what this is going to be?

Ambassador LEHMAN. Senator Quayle, there is an element of truth to that, but it is not because there is a problem, because the problem is not timely yet. It is just now becoming timely, and let me explain what I mean.

The follow-on to Lance is exactly that. It is to follow the Lances which are out there and will be out there until the mid-nineties. So the timing of the whole process has really been driven, not by how fast you could field something, but rather by whether you will have something that is what you want, optimized the way you want it, in time to replace the Lance.

Senator **Quayle**. When, in your judgment, do we need to replace Lance?

Ambassador **Lehman**. We are looking toward the mid-nineties, by 1995.

Senator **Quayle**. Mid-nineties?

Ambassador **Lehman**. Yes, sir.

Senator **Quayle**. So we are looking to replacing Lance in the mid-nineties. When do we need to begin to get on with the program so that we have the weapon there in the mid-nineties? These things do not just happen. What specifically do we need to do in this current fiscal year?

Ambassador **Lehman**. Well, ultimately it will depend on which approach you take. But our view is that it ought to be now, and we have in fact requested a small amount, $15 million, in this budget to allow us to study the candidates and select the best one.

Now, which follow-on to Lance? Well, there are a number of candidates. There is the nuclear version of ATACMS, which would be a nuclear version of a conventional missile we are developing that goes in the MLRS, the multiple-launch rocket system launcher, which will be extremely widely deployed in NATO in the years ahead.

This is one option. It has the advantage of a lot of standardization. A lot of nations will have them. It is a relatively low cost option.

Senator **Quayle**. ATACMS is a relatively low cost option?

Ambassador **Lehman**. That is right.

Another option is the [deleted]. So there are a number of options there that are being explored.

In addition, I should point out that NATO, SHAPE, and SACEUR have identified the requirements. The Defense Ministers have endorsed the requirement for such a system. All the countries that now have deployed Lance have supported the development of a follow-on to the Lance.

You asked whether the problem is in Washington. Well, the answer is we are reaching the stage at which we need to start narrowing and presenting the allies with a specific approach and a specific system. They are not blind to this process.

[Deleted] we are discussing what it is that the NATO countries themselves would think would be the ideal attributes of such a system. And we will take that into account in making our recommendations.

In the end, though, I should point out that the alliance has asked the United States to develop the system, and we are doing so in consultation with the allies, with the understanding that at the appropriate time allies which have Lance will be deploying a follow-on to Lance.

DEVELOPMENTAL MONEY

Senator **Quayle**. Okay. Now, you're asking for $15 million to study and this would also be developmental money?

Ambassador **Lehman**. Early developmental money to select the missile.

Senator **Quayle**. And early developmental money. Will we have decided which program we want to use the developmental money for?

Ambassador **Lehman**. In fact, it is to help us decide among the candidates, looking at such cost factors as performance, standardization and capability.

Let me be very candid with the committee. Among the factors that you have to take into account is whether the follow-on system fits into the force structure. If it is an ATACMS derivative or something that is compatible with the MLRS launcher system, then it has a lot of attractiveness to us because we do not have to buy force structure and it does not involve a lot of additional cost.

ATACMS is one way to do that. But it may well be that some of these other options could be made compatible with MLRS.

If we decide that we are not going with the MLRS option, then we have to look at what are the requirements of these other systems? Are we going to have to buy more force structure? What are the cost implications?

In consultation with our allies we have to look at a number of things. If a system is too big, it will not fit in the MLRS, but it might have longer range. So you might want longer range. But if you have longer range, will it have the survivability and flexibility and accuracy that you need to use it to improve the effectiveness of your forces overall?

Those are the kind of technical tradeoffs that we have to look at, but look at them ultimately in a military context and in the context of what the alliance wants to do.

Senator **Quayle**. My time is up. I assume you will need to lift the ban on ATACMS to proceed?

Ambassador **Lehman**. If we decide to go down the ATACMS route, we will come to the Congress—and it could be later this year—and ask that that be done.

You have permitted us to study this.

Senator **Quayle**. But not development.

Ambassador **Lehman**. That is right.

Senator **Quayle**. Just study. So that if you are asking for $15 million for study and development, if you want to proceed on ATACMS you will have to have that ban lifted.

Ambassador **Lehman**. My understanding is that the work we have in mind for the $15 million is consistent with the legislation.

Senator **Quayle**. With the prohibition?

Ambassador **Lehman**. That is right.

If we go beyond the $15 million, at some point we have got to get the restriction lifted.

Senator **Quayle**. Next round I will pursue that.

Senator **Exon**. Thank you, Senator Quayle.

Senator Wilson.

Senator **Wilson**. Let me just pursue what Senator Quayle was talking about. The legislation does not prohibit the study?

Ambassador **Lehman**. It did, but it was amended.

Senator **Kennedy**. That is right, last year it was amended.

Senator **Wilson**. I will pass further at this point, Mr. Chairman.

Senator **Exon**. Thank you, Senator Wilson.

THIRD ZERO OPTION

Let me return, if I might, to this third zero option line of questions that was advanced by Senator Kennedy. Would it not follow that if short-range nuclear missiles are totally eliminated—would it not naturally follow that we would be asked to eliminate artillery as well? I mean, I do not know how you separate those two.

Ambassador **Lehman**. Senator Exon, I think you are absolutely right. That is not our sole reason for opposing the so-called third zero, but that is certainly a factor.

ZERO-ZERO OPTION

Senator **Exon**. What effect, thinking ahead a little bit, what effect, if any, would these discussions on zero-zero pro or con, positive or negative, what effect would that have on the START negotiations that are now ongoing, both from the internal positions of the NATO allies, and what would you imagine would be the Soviet response to this concept?

Ambassador **Lehman**. There are various aspects to that, and some are positive and some from our point of view would be negative.

The third zero debate in my view is turning out to be positive, not negative. The consensus is re-emerging, at least the mainstream view in Europe is re-emerging, that nuclear weapons in Europe enhance conventional deterrence, but they are there for more than just to counter asymmetries; that in fact, nuclear deterrence itself helps keep the peace.

And that is why Chancellor Kohl was emphasizing the importance of American presence and American nuclear presence in Europe. It keeps the peace.

So in that sense, the long term effect is, I think, to help us approach arms control negotiations with greater confidence.

In the short run, I have to be very candid with you: After INF and the debate over the second zero and the third zero, there was a lot of concern among the responsible people. If there is a lot of time, the notion that we have to be careful and cautious is always helpful to the negotiator. I must say that when people said, now, Ambassador Lehman, remember that caution is important, I always welcome that, as opposed to people urging me to go ahead and give away things.

We right now are at a very important moment in the START negotiations. The reality is we have accomplished a great deal in the strategic arms talks. We have actually gone a long way. The basic structure is as good as or better than what we ever hoped we could get in START.

The key issues now are in the verification area, and we have all discussed it and it is a very difficult area. We went to Moscow just last week, and the point we made to the Soviet Union was: If you want a treaty, you have got to negotiate verification details right now; we have got to see the color of your money in verification up front. The Senate will not tolerate waiting until the last minute to negotiate verification details.

And they say they are going to do it. Well, we hope they will because we have got our two protocols on the table and we are putting down the memorandum of understanding on data, and they have none of those documents on the table, and it is getting awfully late.

They are going to have to negotiate from our document or else it cannot be done. Now, having said that, you ask, well, what are the implications of the debate over double global zero at a time in which we are trying to get the Soviet Union to step up to concluding a START treaty by concluding the very important details of verification.

There is a lot of concern that perhaps we ought not to rush this process. However, if the Soviet Union senses that either the United States, or the United States under pressure from its allies or the executive branch under pressure from the Congress, does not really want to go through with START right now, I think that our leverage will be reduced.

So when I said there was a positive aspect, it is that the debate over double zero reminds us of the importance of maintaining a good nuclear deterrent. The down side is that right now, while we are rehashing these issues, the Soviets are watching and they may begin to hold back at a time when we think we have got good negotiating leverage on them.

NUCLEAR SUBMARINE TECHNOLOGY

Senator Exon. There is one matter that is not directly connected with the subject that we are discussing today, but since you are going to be gone and I will not have a chance to get in touch with you, I would like to raise it. I am wondering if you have any input or views on the upcoming debate that is going to take place regarding the Canadians wanting our nuclear submarine technology. They are proposing to obtain that through Great Britain, and that would include a substantial portion of our closely held technology with nuclear submarines.

What do you know about that as far as the alliance is concerned, and have you had discussions with anyone on it?

Ambassador Lehman. Yes, sir. In fact, there are a number of countries involved, and representatives of all of those countries have talked to the U.S. Government and have also talked to me personally about their views of this matter.

As you know, Canada is perhaps our closest ally. It is not a large country, but it is a very friendly country. They have expressed an interest in procuring a certain number of these submarines and operating them. They have in mind purchasing them from Great Britain or from France.

Senator Exon. Well, purchasing, if I understand it right, but to build them in Canada, is that right?

Ambassador Lehman. They are going to support them there. I will have to get back to you.

[Information was submitted and is retained in the committee's executive files.]

Senator Exon. You are all shaking your heads, but at least that is the information that I have. Maybe the first one, they would buy the British submarine and buy the technology; the first one might come from Great Britain, but eventually they would transfer the construction to Canada. But I do not think that is particularly critical to the discussion, so I will not press it.

Ambassador **Lehman**. They do envision extensive work in their shipyards and they do envision the use of materials or information and technologies that we control.

Now, let me say that a number of questions have been raised about the wisdom of the Canadian decision, whether or not they have the resources and the manpower to support that kind of a force. But I should point out that, even if we have these questions, they are a good and trusted ally and they have indicated this is something they want to do.

So we have said that we are prepared to try to cooperate with them. We are trying to find out more information about exactly the type of program they want to run, and we are reviewing this internally within the U.S. Government even now as to whether or not there is a role that we can play in this process that is more positive than negative.

Senator **Exon**. Well, my time is up. You have just said what is basically the administration line on all of this. What do you have to say about legislative restrictions against the proliferation of our nuclear submarine technology? What have you to say about another friendly ally that might come along and say, well, you made this arrangement and granted authority for Great Britain to transfer the technology to Canada, what about some of our other NATO allies? Would that not break the dam, and would we not be in the spot of saying, well, we cannot choose between our allies any further than we have now, since Great Britain is the only one we have an arrangement with?

I am just saying, would that not be Katy, bar the door?

Ambassador **Lehman**. Well, there is always that danger, Senator Exon. That is one of the reasons why we have been so cautious with respect to this problem.

Senator **Exon**. Frankly, I do not think you have been very cautious.

Ambassador **Lehman**. [Deleted.]

I do not believe that the administration has made a final decision on this. What I do believe is that whatever our internal concerns about the viability of the Canadian program, we have said to the Canadians that we will consider it, and that is what we are doing.

Senator **Exon**. Does the administration understand that the Congress has a role to play in this?

Ambassador **Lehman**. Absolutely.

Senator **Exon**. Or do they think that they can automatically go ahead with this as an administration?

Ambassador **Lehman**. We understand the congressional role. I mean, the nuclear area is one where the rules are very, very strong and laid out very carefully, and we understand that.

Senator **Exon**. Thank you.

Senator Warner.

ROLE OF CONGRESS

Senator **Warner**. If I could follow onto your question, what is your understanding of the role of Congress and how does the administration propose to procedurally follow that?

Ambassador **Lehman**. My understanding is that legislation would be required if this technology was to be transferred. Now, whether there is some other type of cooperative arrangement that would require legislation, I am not aware of one.

And I would be prepared to answer that for the record.

Senator **Exon**. I wish you would, because I think it would be against the law for you to do that. All I am doing is sounding a potential warning that this is not something that the administration, regardless of the political pressure that is brought to bear on them by our friends the Brits and our friends up North, can agree to on their own.

[The information was submitted and is retained in the committee's executive files.]

Senator Warner.

Senator **Warner**. Mr. Chairman, thank you for the courtesty of recognizing me.

I would simply say that, in view of the sensitivity of this decision, it seems to me that some consultation with Congress before the administration reaches a final decision would be helpful. Otherwise, if you were to make a decision one way or the other, then let us assume that you do and then come to the Congress, and the Congress were to disagree, you have got, it seems to me, a confrontational situation that might have been avoided if Congress had been consulted ahead of time.

Would you make known to the Secretary at least this Senator's view that some consultation would be helpful. I do not know about the chairman or other members of the committee.

Ambassador **Lehman**. I will make that known to him. But let me say that Secretary Carlucci and I have had a number of discussions on this matter, and the Secretary has already spoken to members of the Congress, some members of the Congress.

And I am sure he is prepared to discuss it with any members of the Congress who have an interest.

Senator **Warner**. For the record, he has not discussed it with me. Not that he has any obligation to—maybe some tangential reference.

Senator **Exon**. Just for clarification, I have talked to the Secretary about this. At least that was the first word from the Congress at least I knew of that had been passed along to the Secretary, just as a word of caution. That is what I got across to the Secretary, what you just suggested, Senator Warner.

Senator Warner, you are up. As you walked in, you are up for your 5 minutes.

Senator **Warner**. I will yield to the members of the committee. Thank you very much.

Senator **Exon**. I finished my second round.

Senator Thurmond.

Senator **Thurmond**. Thank you very much.

ARTILLERY-FIRED ATOMIC PROJECTILES

General Ryan, has the SACEUR or JCS determined the number of artillery-fired atomic projectiles required for the flexible response strategy? And if so, what is the desired mix of 8-inch and 155 millimeter rounds, and how does this compare to the mix that will result under the current program if legislative constraints remain?

General RYAN. Sir, we currently have [deleted] old AFAPS in the stockpile. [Deleted.]

Production of the 155 will be restricted to [deleted] and the production of the W-82s will have an IOC in [deleted].

The production for the last [deleted] has not yet been secured. The cost for the total [deleted] AFAPS is $214 million and that is over a 4 year period and does not include the DOE costs. The DOE costs are estimated at about $570 million and that is over an 11 year period.

[Additional information follows:]

Let me provide some background. Our total requirement for AFAPs is determined based upon the Nuclear Weapons Requirements Studies of each of the CINCs. We need to build toward that goal as we modernize, consistent with a prudent balance between risk and resources. [Deleted.] Lifting the congressional restriction will allow modernization of the entire AFAP stockpile, thereby providing a better balance between the 8-inch and 155 mm AFAPs, as well as a better balance of those AFAPs to the existing mix of 8-inch and 155 mm howitzers.

POST-INF STRATEGY

Senator THURMOND. Secretary Lehman, we hear conflicting reports on whether or not the alliance needs to develop a comprehensive post-INF strategy that would address modernization requirements and arms control initiatives.

What is your view?

Ambassador LEHMAN. Senator Thurmond, I guess you are asking the other half of the question that Senator Glenn asked about whether our basic strategy is sound. I think the alliance continues to review our basic strategy, and from a military and geopolitical point of view it is sound.

When you add in the arms control dimension, we believe that the arms control regime or approach that was laid at the Foreign Ministers' meeting in Reykjavik was appropriate. It is in essence a step by step approach that would have us, following the INF Treaty, focus on a strategic arms reduction treaty.

As Senator Glenn has pointed out many times, and I think it is correct, one should not underestimate the significance of that step. And what steps one takes after that step in the strategic nuclear arms control area are not obvious, and one should approach them after careful consideration, having seen what one got.

In addition, we have emphasized within the alliance the importance of establishing a conventional balance and of getting a handle on the problem of chemical weapons. So many people have asked: Well, but you have not explained how you get rid of the last nuclear weapon?

I am not sure we have got a good story to explain what do we do after START. But what we know is that it ought to be done carefully and in full consultation with the alliance and taking into account the realities of the military world, which involves the conventional balance in Western Europe in particular.

General PARTLOW. Sir, could I take you back just a second on that, because I think it ties back in with something Senator Glenn said. The problem that Senator Glenn pointed out with strategy is not a problem which is nuclear weapons based. It is a problem that is conventionally based.

That is to say, the reason that what Senator Glenn suggested would happen may happen, forcing us to make some decisions we would prefer not to have to make with regard to the use of any sort of nuclear weapons are because our conventional forces are only marginally adequate to do the job.

The Chiefs, when they came before the full committee and testified, reminded us of that. What then are the next steps in arms control? If your problem is conventionally based, then you want to attack that problem in the first instance. And that is why the Reykjavik decision, the second leg of the Reykjavik decision, was in fact to try to do something about the conventional imbalance.

As Secretary Carlucci said in his testimony before the entire committee, it is going to be very difficult, and this I think plays into the whole third zero and the political kinds of to'ing and fro'ing that are going to have to go on between ourselves and the Federal Republic of Germany, because, as Secretary Carlucci pointed out, if I remember his testimony, it is not likely that the American people in his view would leave a lot of troops in Europe in a situation in which they were not protected in some way by adequate defenses.

And he clearly meant the modernization of the remaining nuclear forces that the Chiefs have testified would have been necessary whether there was an INF Treaty or not.

So I think that these things are all in that way interconnected. And the strategy that you spoke of, sir, I believe is partly a strategy of arms control, and that is why we are a little allergic to the third zero at this stage.

NATO NUCLEAR POSTURE

Senator THURMOND. General Partlow, in 1984 the Defense Department provided the Congress with a report on the nuclear posture of NATO. The assessment of the NATO-Warsaw Pact non-strategic nuclear force balance at that time was of a Warsaw Pact with sustained, vigorous modernization and a numerical advantage and a range advantage and a NATO with limited modernization, aging stockpiles, and range deficiencies.

Has the situation improved for the NATO alliance in the interim, and how would you characterize the non-strategic nuclear force balance today?

General PARTLOW. Well, I think probably I ought to take that question for a more complete answer, Senator Thurmond, if it is agreeable here. But there have been no significant improvements in the non-strategic nuclear force situation since 1984, with the notable exception, of course, of the INF deployments which we have made since that time.

One would presume that the context of your question would be cast in a post-INF environment, in which case without the force modernizations which we are here to speak of today, the situation that the previous studies unearthed would be essentially still with us. I think that is a fair characterization of it.

That is a fairly complex question, sir, and I think we need to take that for the record.

[The information follows:]

We have made many improvements to our non-strategic nuclear forces in the 1980s. We deployed the Pershing IIs and a significant number of ground-launched cruise missiles. The United States and the allies have deployed and modernized our dual-capable aircraft, we have modernized some of our artillery-fired atomic projectiles and our air-delivered nuclear bombs, we have strengthened our air defenses, improved command and control, and have added aircraft shelters. As you might expect, the Soviets have made improvements too, and thus it is difficult to state that we have made a significant change in the balance. What can be said, and you have heard it often in testimony, is that on balance we believe the change that will come about as a result of the INF Treaty will be in the best interest of the United States.

Senator THURMOND. Thank you.

I believe my time is up, Mr. Chairman.

Senator EXON. Thank you, Senator Thurmond.

Senator Kennedy.

Senator KENNEDY. Thank you, Mr. Chairman.

ATACMS

To go back to the ATACMS, as I understand now, with the change that was made last year, that you have the ability to at least study the question of a nuclear-tipped system and just try to get some of the facts out. As I understand it, the deployment of conventional ATACMS was 1991 or 1992?

Ambassador LEHMAN. That is correct.

Senator KENNEDY. So we have still got that distance before we are even going to deploy.

Ambassador LEHMAN. That is correct.

Senator KENNEDY. And the prohibition that is still in effect then is the testing and development and deployment. That is still the prohibition. And as I understand, even though we are not going to deploy a conventional system in 1991 or 1992, and even though you have not concluded the study on this, the Secretary is going to make a recommendation evidently to lift the prohibitions even on the testing of ATACMS?

Ambassador LEHMAN. Senator Kennedy, if we are going to develop ATACMS as a follow-on to Lance, we may well want to do more than simply study in the period that is coming up, I mean fiscal year 1989. In that kind of environment, if we felt we had to do that we feel that we should come to the Congress and let you know the facts as we see them and lift the ban. We would intend to do that in a straightforward way.

Now, we could have and we would consider just sending up that legislation right now. But our view was that we said we wanted to study it and so we wanted to get some of that work under way and get some work done and then come back to you.

Now, Senator Kennedy, I do not know whether this room is bugged, but Secretary Carlucci urgently needs to speak to me. Could I be excused for a second?

Senator KENNEDY. I hope this is not on my time. [Laughter.]

Senator EXON. I might say that, while the Ambassador is gone, are there any questions that you have, Senator Kennedy, or any other members of the panel, to either General Partlow or General Ryan?

Senator KENNEDY. I just had one final question for the Ambassador.

Senator QUAYLE. I might ask General Partlow. You have been involved in the INF Treaty debate and all of our discussion on new type and verification on that. [Deleted.]

General PARTLOW. [Deleted.]

If you go with this potential for the follow-on to Lance, you reverse that process. [Deleted.]

But the manufacture of second stages of Pershing missiles is prohibited by the INF Treaty. [Deleted.]

So you would invite the Soviets to camp out outside wherever you were making the second stages, and you would have a perfectly analogous situation. They would be using a stage of a missile to create a strategic missile which is outside the top end of the INF Treaty and [deleted].

If I sound like this is something that appeals to me, it appeals to my sense of fair play. I do not know whether it is a very good follow-on to Lance system. [Deleted.]

Senator QUAYLE. You used the words "outwardly similar but not interchangeable." But what if it was outwardly similar and interchangeable?

General PARTLOW. It is banned. If it is outwardly similar and interchangeable, it is the stage and it is banned by the treaty. And that is true whether we are talking about the SS–20 stage or whether we are talking about this idea I just expressed to you.

Senator QUAYLE. But the thing is, we say—I think it is in article VI. I would have to get it back out. But what we banned is something that is outwardly similar but not interchangeable?

General PARTLOW. Sir, you and I have been down this road before.

If it is outwardly similar and interchangeable, that means you could make an SS–20 out of it. If you could make an SS–20 out of it, it is an SS–20 stage. If it is an SS–20 stage, it is banned.

Senator QUAYLE. Save that for later, going down that road on that interpretation.

Let me just ask a simple question. Do you think that we would raise any concerns if in fact the Soviets said that they are going to deploy an SS–20 derivative similar to the SS–20, less than 500 kilometers?

General PARTLOW. Well, I think the more likely possibility for the Soviets—and this really gets back to some other questions that have been asked. The more likely possibility for the Soviets is to play around with the SS–23.

Senator QUAYLE. But if they said—because I had not heard of this [deleted]. But if in fact we are going to refer to it as a [deleted] and the Soviets say, well, gee, okay, if you are going to go ahead and look at a [deleted], we will just look at an SS–20 derivative, then I just wonder what kind of treaty problems you are going to be raising with this thing. We have already got Shevardnadze complaining that the follow-on to Lance, looking at ATACMS, may be in fact a non-circumvention of the treaty.

I just warn you that if you start using [deleted], I am not going to raise it, but I guarantee you somebody will raise it. And I think you are asking for some political problems. You have already got enough political problems with this thing.

And if in fact the Soviets start using an SS-20 derivative type thing less than 500 kilometers, a few of us might start saying, wait a second. We are not going to get into the spirit of the treaty, but I just think that you ought to think about [deleted] as the follow-on to Lance.

I do not think it does you any good, and I think it complicates an already very complicated problem.

Senator **Exon**. It seems to me that was a bad choice of words.

Senator **Quayle**. To say the least.

Senator **Exon**. Let us return to Senator Kennedy. He said he had one more question.

NUCLEAR TIPPING ATACM

Senator **Kennedy**. Ambassador, do I conclude correctly that you will do some study prior to the time or you will do the study that has been authorized by the DOD authorization on nuclear tipping the ATACMs prior to the time you make a request to lift the prohibition for any kind of testing or development?

Ambassador **Lehman**. Yes, sir.

We are going to be doing that study. And if in the course of this work that we are doing, we decide that we need to go further than just the study, we would have to come up to the committee and request that.

At what exact point in the program that such a decision was made, I am not sure I can answer. I can try to give you an answer for the record.

Senator **Kennedy**. Fine, if you would just provide it for the record. And perhaps as part of that response for the record you could give us some idea of how much has been done to date.

Ambassador **Lehman**. I would be glad to.

[The information follows:]

Defense and Energy initiated warhead studies for the FOTL in May of 1987 excluding ATACMS since this was Congressionally restricted. In December 1987, ATACMS was added to the study with the enactment of the fiscal year 1987 DOD Authorization Act. It was important that this study be initiated and proceed expeditiously to allow for the development of the FOTL system, missile and warhead, to meet SACEUR's mid-1990s requirement. In the post-INF environment, the established DOD IOC has been described by SACEUR as imperative, with an earlier IOC desirable. To meet the established requirement, the Army must complete studies and analysis, select the system and missile, and start long lead times procurement for the warhead to missile interface in fiscal year 1989. ATACMS is inhibited from full consideration because of the potential delays associated with the current restrictive language. For ATACMS to be considered without prejudice, and if selected, for the Army to have the opportunity to meet SACEUR's requirement, the remaining restrictions must be lifted during this fiscal year.

Studies examine the feasibility and cost of modifying the ATACMS in order to replace the conventional warhead with a nuclear one. This includes requirements for nuclear-peculiar functions of fuzing and firing, safing and arming, permissive action and disabling and determining if the missile and nuclear warhead can adequately withstand the rigors of the stockpile-to-target environment. Until the 1987 DOD Authorization Act, we were precluded from studying ATACMS, although it appeared to be the best candidate for reasons I have already cited—production costs, force structure savings and survivability, among others. Now that we can evaluate all options, we will probably be able to make the decision before the end of fiscal year 1988 and will want to press ahead immediately to full-scale development in order to meet SACEUR's requirements. This is primarily because DOE tells us it takes at least 4 years to modify the warhead once the missile carrier is known, assuming an existing warhead is used. It would take longer, up to 7 years, to develop a new warhead. To begin engineer development of the modified warhead, DOE must purchase components which take 9 to 12 months to produce. If ATACMS is selected, we will need the restrictions on full-scale engineering development lifted in fiscal year 1989 to purchase these components for delivery in fiscal year 1990.

Senator **KENNEDY**. Thank you, Mr. Chairman.

Senator **EXON**. We will continue in the regular order, then, unless you wish to tell us at this time what the Secretary told you about the problem with the Canadians on the submarines.

Evidently he did not. Senator Wilson.

Senator **WILSON**. Thank you, Mr. Chairman.

SURVIVABILITY OF MODERNIZED SYSTEMS

Mr. Ambassador, let me ask you a question. In your statement you have alluded to the response of the allies to the High Level Group recommendation for undertaking measures to enhance the survivability of our modernized systems, particularly those relating to the DCA, and talked about the weapons storage and security system and spoke of the hardening of aircraft shelters and other measures.

Realistically, what is the assessment of the adequacy of those measures? I have in mind a hearing some 18 months or so ago when Senator Warner was the chairman of this subcommittee and we entertained a presentation from Dennis Gormley on the subject of the great threat posed by the increased accuracy and devastating capability of Soviet missiles.

The scenario he painted at that time was one in which the classic vision of a Warsaw Pact move against the West with a hundreds of miles wide armored front moving under artillery barrages gave way to about a 6-hour period in which virtually all our POMCUS sites—airfields, ports, all the means by which we could reinforce or resupply—would have been not just interdicted, but virtually destroyed by such a Soviet or Warsaw Pact missile attack.

And the conclusion of his presentation and the purpose of his making it had to do with goosing NATO and the United States on the development of an anti-tactical ballistic missile system.

Could you coordinate that? I know it was not part of Montebello. I know it has not been part of what has followed on since in the terms that you described here. But how does that tie in with what you have talked about here in your presentation?

Ambassador **LEHMAN**. Well, we have begun to make some progress on getting NATO infrastructure funding, and we are working on modernization, not only of weapons storage, but of protective facilities for aircraft. In that regard, we have also begun to take a look at some more exotic approaches to design that would hopefully help against the type of threats which you describe.

But obviously, in addition we have the ATM program. In this regard, let me say the INF agreement has not altered our interest in ATM. We still see an important role that an ATM system can play, and we are continuing that work.

Our view is that they all work together, that clearly survivability is an important part of our nuclear deterrent and there are a number of ways to achieve that. And sometimes there is no one single answer that does the job and you may wish to have a number of things working together.

Senator WILSON. Can you give us any kind of a status report as to where we are?

General RYAN. Sir, I can give you perhaps one as regards aircraft shelters. We saw a requirement for about [deleted] shelters that were hardened. To date, we have either funded or constructed about [deleted]. We have about $100 million to go to finish our portion of it, and it would be about another [deleted] shelters.

Now, that is just a very small portion of your overall question, but it is indicative of some progress.

Senator WILSON. It is indicative of some. Let me just ask you a question. What happens if they drop one smack on the most modern shelter? The only place I have ever seen any of those, candidly, is in Israel, where they have revetments, underground hangars.

But what happens if one of those gets a direct hit?

General RYAN. The shelters that I am talking about will withstand virtually anything except a nuclear attack. They will not stop that.

Ambassador LEHMAN. You correctly pointed out, Senator Wilson, that we can develop a new design that works against a certain type of conventional munition, but then there comes an advanced conventional munition that calls into question the effectiveness of the shelter against it.

So it is an ongoing process. It is like tank-antitank, armor and shells. In that regard, that is another reason why we continue the vigorous program on ATM, because you need to call into question their ability to simply have free rein in attacking your shelters.

Senator WILSON. Do you know what the Soviets are doing in that regard?

Ambassador LEHMAN. With shelters or ATM?

Senator WILSON. ATM and shelters.

Ambassador LEHMAN. I think the committee may have seen some of the intelligence briefings, but clearly they have been testing a number of their surface to air missiles in a mode which would permit them to operate perhaps in the ATM role.

And in fact, we have even wondered about the ABM capability of some of these systems. So they obviously have an interest in ATM.

Senator WILSON. It appears my time has expired. I would like to get a more detailed answer than that which either you or General Ryan have been able to provide.

Ambassador LEHMAN. We would be glad to.

[The information follows:]

A key element of Soviet military doctrine calls for active and passive defense to act together to ensure wartime operations and survival. With respect to active defense against tactical ballistic missiles, the Soviet Union is deploying the SA-12a/Gladiator as a sophisticated, mobile, long-range tactical surface-to-air missile and antitactical ballistic missile system. The longer-range SA-X-12b/Giant, still under development, is assessed to have good capability against short-range ballistic missiles and some potential capability against medium-range ballistic missiles. This system in particular, and possibly the SA-10 surface-to-air missile as well, may have potential capability against some types of strategic ballistic missiles. With respect to passive defenses, the Soviet Union has undertaken a major program to harden military forces and command centers to make them resistant to attack.

Senator WILSON. Incidentally, when you say if we finish [deleted] we have all completed our part of the bargain, you are saying the rest have to do with the Tornadoes, about the aircraft shelters?

General RYAN. Yes, sir, about 70 percent NATO-funded.

Senator WILSON. How are the allies doing on their part?

General RYAN. I cannot give you a definitive answer on that, sir. I will take that for the record and provide that for you.

[The information follows:]

NATO policy is to shelter [deleted] in-place and reinforcement aircraft. [Deleted.] Sheltering [deleted] was accomplished in prior years under a special NATO-funded program.

[Deleted.]

Senator WILSON. Okay.

I do know my time has expired, Mr. Chairman. Let me just end this up.

AIRCRAFT SHELTERS

What about other than aircraft shelters? For example, what about the POMCUS sites? What about rail? What are we doing? My impression is nothing; it is wide open.

Ambassador LEHMAN. There are a number of key facilities that are simply not hardened, not only not against nuclear, but not against conventional. Many of them are extensive facilities.

Senator WILSON. Gormley's testimony had to do with conventional attack.

Ambassador LEHMAN. There is no doubt that we have key facilities, including some of our POMCUS facilities, that are not protected. If their attack gets through, the damage will be extensive.

Senator EXON. Thank you, Senator Wilson.

Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman.

WEAPON SYSTEMS

I still have trouble, I guess, deciding what weapons systems we need. For instance, the Lance follow-on, what should we have as its range, its CEP? What kind of warhead size do we want on that thing?

Is the requirement being determined by our allies or by us? Should we use the Tomahawk dual-capable missile? What role are they going to perform? The artillery-fired atomic projectiles?

As long as we have got this forward defense strategy—and I hate to keep coming back to that, but it is critical to my way of thinking—knowing what weapons system we buy has to follow up on our defense strategy.

Flexible response to me is nothing more than what they have taught ever since Napoleon's day on maneuver warfare staying loose, and keeping some of your forces out and in. Every War College class I ever had taught flexible response, by different names such as maneuver warfare.

So that is nothing new, and we act as though this is something brand new and it is going to solve all the problems of forward defense. And I just do not think it is.

So I am very concerned about this issue, when every test we have ever made of this whole concept has not worked as far as I know.

Also, General Galvin comes over and he testifies—I just read it out of his statement a moment ago—that the Soviets have 60 to 90 days of supplies deployed. Not back someplace, these are deployed up there right now. And so our FOFA concept begins to be a little suspect. We have got about 3 months supplies up there ready to go right now.

So all this follow-on interception we are going to do back here is going to be a very short-range FOFA, because they are up there ready to go right now. So that approach gets a little bit suspect.

Then, David Abshire testifies that we are maldeployed and our readiness factor is down and our sustainability is down.

Now, it looks to me like we have an awful lot of work to do in this area. A lot of the problem is our allies are not putting their people up in that northern plain area where they should be. And it is very disturbing.

And NATO, now then somebody testified, everything is looking better because we now have a planning group established within NATO. Well, it is just difficult for me to see where our weapons systems that we are supposed to furnish money for fit into this whole concept, and we do not even know whether they are in support of this strategy.

And we are just developing a new weapons system, saying it will fit in a certain range? Are our weapons buys really being tailored to our strategy? If it is, it is not apparent to me.

Ambassador LEHMAN. Senator Glenn, it is true that flexible response has been around a long time. Anyone who looks at our real nuclear targeting policies, as opposed to our declaratory policies, knows that our policy was flexible response before we gave it that name. And it will probably be flexible response long after some other administration gives it another name.

You are right, there is a tendency to view flexible response as a sort of fairly general political-military cover for a wide range of options. And it is true that within the basic strategy one has to change it and alter it in terms of its specific implementation and in terms of the technologies and weapons we use.

FLEXIBLE RESPONSE

Senator GLENN. Let me ask one specific question if I could. Does not our flexible response basically mean as long as we are tied to forward defense—it seems to me what we are most likely to face is a situation that makes the nuclear decision much, much more likely earlier in the conflict. Because if there is any serious breakthrough we are in deep, deep difficulty, and the nuclear response has to be made then if it is going to be made, or they just take over?

And to go back to your boxers thing, as one of the staff handed me a note a little while ago: The problem, Senator, is if the boxer you are up against is Mike Tyson, your strategy may be of limited use. And that is very true, because if I am looking up from the mat, which I would be against Mike Tyson, I am sure—we are about the same weight category, but I imagine he is in a little better shape than I am—this is not going to do much good, to have all this strategy once they have made that breakthough and we have the nuclear response or nothing, or we just gave up.

That is the reason I am concered about it. We tend to go into all the weapons system, and yet I am not sure the weapons systems are being bought to go into a situation that is most likely to develop.

Ambassador LEHMAN. [Deleted.]

[Deleted.] If you want me to say on the record or off the record, or publicly or privately, they ought to buy more ammo, I will say it: They need to buy more sustainability. And every time I see them, I remind them of it, and I am glad that you do also. It is a problem.

Senator GLENN. The Montebello reductions have already occurred, right?

Ambassador LEHMAN. Yes, sir.

Senator GLENN. So we are down a third from where we were in nuclear weapons in Europe, then?

Ambassador LEHMAN. From 1979, that is correct.

Senator GLENN. INF then comes in addition to the Montebello?

Ambassador LEHMAN. That is correct.

General PARTLOW. I would like to piggyback two quick points, sir, on what you said. First of all, I understood you to suggest that follow-on force attack is designed primarily to damage or destroy supply bases, the sustainability the Soviets have. Basically, follow-on forces attack is designed principally to frustrate the follow-on echelons that the Soviets would apply to the battlefield.

It is designed to give our guys that are in the fight at the forward edge a chance not to have to face Soviet follow-on forces in the sequence the Soviets would like.

What we are trying to do is frustrate the timing of the second and third echelon. It is not essentially, although part of it certainly is, attacking sustainability.

Senator GLENN. I was emphasizing logistics, you are right. And it is part of the battlefield maneuver also.

General PARTLOW. Conceptually, that is the design.

The other point I would like to make to you, sir—and analogies are not altogether successful, but if I were a German and someone said, the way we are going to fight this war is trade your space for our time, I would have problems with that.

Our forward-based strategy is politically motivated. You are absolutely right, sir, in a classic military sense. But the German people and German politicians are not particularly interested, as I see it, in saying, well, let us go back to some place on the other side of the Rhine or, for that matter, the French border and then let us get ourselves organized, and then we will retake West Germany.

That is not something that excites them as a strategy. So we are faced with having to make do with a military strategy—and you can go back to Clausewitz here—which in fact reflects the political realities of the situation.

Senator **Glenn**. Political realities are not going to mean much if you lose the war.

Senator **Exon**. Thank you Senator Glenn.

155MM NUCLEAR ARTILLERY SHELLS

I just have two questions. First, Ambassador Lehman, when we begin to take delivery of the new 155 millimeter nuclear artillery shells, do we have the authority to move these into Europe to replace the old ones? And if not, what consultation or agreements are necessary before we can do this?

And the follow-on question is, what is the status of the deployment of the 8-inch nuclear artillery shells to Europe? Does that have a relationship to the new 155s?

Ambassador **Lehman**. Yes, sir. Let me answer the second question first. [Deleted.]

Senator **Exon**. Is what? [Deleted.]

Ambassador **Lehman**. [Deleted.]

Now, in the case of the 155, [deleted]. As you know, part of our problem in the case of the 155 is that quite a number of our allies were procuring a new artillery piece that would not use the old 155, and so it was very important that we have a modern 155 round to guarantee that we could in fact have this mission shared among a number of the allies.

[Deleted.]

Senator **Exon**. What is the timetable on that?

Ambassador **Lehman**. About [deleted].

Senator **Exon**. You mean that is when the shells will be available, right?

Ambassador **Lehman**. [Deleted.]

Senator **Exon**. Thank you.

ACCEPTANCE OF MODERNIZATION

My last question goes back to the first series of questions that I asked you with regard to the acceptance of modernization. Chancellor Kohl made the statement at the Wehrkunde Conference. You stated that today and that is accurate.

However, I get the impression that when Chancellor Kohl says he favors modernization, he has in mind modernized systems with enough range to hit Soviet and Pact targets and their territory.

What do you think of my conclusion on that? Is that accurate?

Ambassador **Lehman**. Well, that could be an element. But let me say that the general spirit of the Montebello process which Chancellor Kohl and his government have expressed interest in is the notion that with systems of greater range you can reduce the number of systems that you need. In theory, if you had, say, 100 nuclear artillery shells deployed to guarantee that, if you needed them, you could hit this target here, and then if you had a system that was much further back that could cover a good part of that range, then perhaps you could get by with a much smaller number of systems because you could now cover a larger range of contingencies with a smaller number of weapons.

The German Government has expressed a lot of interest in that aspect of Montebello. But there are more factors than just range, including survivability, accuracy, and the ability to react in a timely manner.

If a system is so far back, so large, not survivable, and only available in extremely small numbers, that is not a very attractive system. It does not solve all your problems. So we look toward a mix of forces. What we are really talking about in NATO is an adjustment of the mix of these systems.

In Germany the political argument, which you mentioned before, that "the shorter the weapon the deader the German" obviously cries out for a political answer that says the missiles go somewhere else, but they certainly do not land in either West or East Germany.

Well, there is a fundamental flaw in that argument, and that is that the longer the range, the more weapons that can hit Germany if that is where the war takes place. The Germans have a fundamental problem. They are along the FEBA as long as Warsaw Pact forces are poised to strike them.

The problem is not how long range our systems are. The problem is the Soviet systems, where are they, and what they are going to do.

I think the real German position is that they would like to see deterrence enhanced by the minimum number of forces possible, and they recognize that with survivable systems that are more responsive, more accurate, and more flexible, we can reduce their numbers.

Senator **Exon**. Well, Mr. Ambassador, I hope you are right.

You and I attended a function not long ago where I had some discussions with some people who I thought were experts on the European situation, and particularly with regard to Germany. And they did not share your positive opinion on what the eventual outcome was going to be. In fact, they were telling me that it would be extremely difficult and could cause the fall of the Kohl government if he would agree to the deployment of the short-range weapons, given the nuclear-free concept that seems to be growing in Europe.

But you know all that. I am not telling you anything new. Good luck in your negotiations in this area.

I think an awful lot of Chancellor Kohl. I think he is a man of an awful lot of stature and an awful lot of wisdom. But he is also a politician.

Senator Wilson.

TRIPLE ZERO OPTION

Senator **Wilson**. What is our official policy at the moment in terms of the Germans' at least perceived enthusiasm for the triple zero option? What are we doing about it?

Ambassador **Lehman**. We are opposed to that. We have made our opposition clear, and we have expressed our position in the Reykjavik communique from the Foreign Ministers meeting last year.

Senator **Wilson**. I know we did it at Reykjavik, but what have we done since they have sounded this?

Ambassador **Lehman**. We have continued to tell them that we do not think it is a good idea and we have no interest in getting into such a negotiation.

As you know, Secretary Carlucci has been very vocal in reminding people that nuclear weapons exist in Europe not simply to counterbalance the conventional imbalance, but also because nuclear deterrence helps keep the peace. Some people caricature this position by saying as I think was said at Wehrkunde, something like, when the last Warsaw Pact soldier turns in his bayonet, the last American artilleryman will turn in his last nuclear shell.

I do not want to caricature it like that. But I must say that in the first half of this century probably over 100 million people died in so-called conventional wars, largely as a result of world wars that grew up out of central Europe. In a comparable period of time, there have been no wars in central Europe, no world wars, and no nuclear wars.

Senator **Wilson**. You do not have to persuade me. You have to persuade the Germans.

Ambassador **Lehman**. I think the Germans are starting to persuade themselves. I do not mean to say it is always going to be easy.

If I could share with the committee a private conversation I had with a private German citizen. I will not name names, but he came to me and mentioned the line that "the shorter the range the deader the Germans." He said that we have got to have modernization, and that everybody knows that. There is a lot of political gamesmanship right now, but basically everybody knows it and knows that it is in the interest of Germany.

So here is the deal: We want follow-on to Lance, and you give up nuclear artillery. And I said: Well, that is fine if that is what you think is in Germany's interests. But you know, as I remember it, it was not that long ago when I used to hear German citizens, defense experts, scholars, and politicians emphasize the importance of nuclear artillery as the very symbol of forward defense, that this meant that the territory of Germany will be inviolate, because the Soviet Union is faced with the threat that not only forces them to disperse their conventional forces, but faces them with the possibility of nuclear use early on. Therefore, it was the Germans who often were the most vehement on the need for nuclear artillery.

And he slapped his hand down on the table and said: You are right, I remember those conversations; we always took that position.

And I said: Well, what has changed?

And he thought about it a while and he said: Well, actually, I guess maybe nothing has changed, except that we just had forgotten what we were thinking about before.

And I said: It seems to me that before we rush off and do anything crazy, we all ought to have a good discussion, a good analysis, maybe even a good debate, in all our countries, to make sure we understand what we are doing and why we are doing it.

I think the Germans are going through that right now. There are a lot of factors. There are partisan political factors. There are ideological factors. There are foreign policy considerations about the future of Europe, questions of East-West relations.

But the bottom line is that before we rush off and do anything crazy, the Germans have got to think very carefully what is in their interests. I think that they are going to discover that the denuclearization of Europe is not in their interest.

I think they know that. I think they are starting to say it.

General PARTLOW. I think, too, there are three data points, sir, that I think can be brought to bear or will become apparent to the Germans. One should already be apparent, because the Chiefs have so testified in public hearings here.

The Chiefs did not condition their acceptance of the INF Treaty on modernization, but they understood throughout the entire process of examining the treaty that modernization was an ongoing thing that was going to happen. So if you come back now and tell the Chiefs to factor into their analysis that there will be no modernization or there will be a triple zero, that I think is going to have a significant impact on everyone's calculus on both sides of the Atlantic.

The second data point: The Soviets do not contest the legality of modernization. We have public testimony out of the Soviet Union which has been passed to this committee to that effect. And even though they talk about the spirit of modernization, the Soviets do not contest the legality of modernization of systems below 500 kilometers.

And third—and this is very early and very tentative——

Senator THURMOND. You are speaking about conventional weapons?

General PARTLOW. I am talking about nuclear weapons below 500 kilometers. They do not, sir, contest that those weapons can be modernized. And they are on the public record in the Soviet Union, Foreign Minister Shevardnadze, is on the public record to that effect.

Finally, and this is very early and very tentative—in fact, it is just as of today as we understand it, but there are indications that the Soviets are proceeding very early and very tentatively with modernization of their own systems at those ranges.

So I think this is in partial answer to your question, sir. But I think when those kinds of things are made known to the necessary German decisionmakers in places like the High Level Group which Ambassador Lehman chairs, I think those will have a very therapeutic effect on the German consideration of those problems.

Senator WILSON. Thank you.

Senator EXON. Thank you, Senator Wilson.

Before we go on to Senator Glenn, I just wanted to correct something for the record. I did not interrupt you at the time, but when you started your questioning, Senator Wilson, you said—I thought you said something to the effect of, the chairman's enthusiasm for the triple option. Did you mean the chairman or the Chancellor?

Senator WILSON. I said the Germans.

Senator EXON. I am sorry. I am not enthused about the triple zero option.

Senator WILSON. I did not have the impression that you were. It was the Germans, not the chairman.

Senator **Glenn**. I heard it the same way you did and I was going to bring it up because I thought you misspoke. I understood it the same way.

Senator **Exon**. Senator Glenn.

WEAPON SYSTEMS AFFECTED BY THE INF TREATY

Senator **Glenn**. During our recent visit to Sandia, I was told that they thought that some of the warheads that will come off as a result of the INF Treaty could be used directly on some of the tactical weapons, such as the B-61 air-delivered bomb. Is that your impression?

Will that be done? And if so, what other systems will be affected by that?

Ambassador **Lehman**. Senator Glenn, with respect to the specifics of the B-61, I do not know the answer. Let me give it for the record.

But we clearly have protected the option of using those warheads on other systems. Indeed, as you know, we are looking at things like [deleted]. That could be an option. So we are protecting those options.

[The information follows:]

We are protecting the option of using those warheads on other systems. It has not yet been determined whether the Pershing II and GLCM warhead devices can be used in their current configuration on other systems. DOD has several modernization R&D efforts underway that were initiated in 1983 following the Montebello Decision. There could be substantial cost savings if the Pershing II and GLCM warhead devices can be used for the modernization efforts rather than disassemble these devices and build new ones. Using these existing devices would also increase the likelihood that the systems selected from the R&D efforts could be produced and deployed to meet theater CINC specified need dates. If the Pershing II and GLCM warhead devices are not selected for use in the systems currently in R&D, [deleted].

Senator **Glenn**. There is nothing in the INF that prevents us or them from using the removed nuclear explosive devices for anything we want to use them for, for source material, or to put them on another delivery vehicle?

General **Ryan**. That is correct.

General **Partlow**. But I should say, sir, that there are several different warheads involved, warhead types in INF. But our understanding, both of what the Soviets can do and what we can do, precludes literally taking the physics package or the warhead out of one of these and bolting it, without doing anything, into another system.

There is more to it than that for both sides. What more to it there is depends a lot on which two systems you are talking about.

[Additional information follows:]

For the United States, we have not identified specific uses for the Pershing II and GLCM warhead devices. DOD has several R&D efforts underway to achieve the modernization programs called for by Montebello. [Deleted.]

The situation should be similar for the Soviets. Using various mechanical and electronic adapters, the weapons could be carried by other larger systems. However, without some extensive reworking and testing, simulation etc., there would be a penalty in system effectiveness and efficiency, as well as yield.

Senator **Glenn**. Now, that is very important. That is the first time I have ever heard that brought up.

Ron, is that your understanding of it, too, that there are limitations on what we can use the warhead for?

General PARTLOW. Let us make sure we are clear, sir. There are no limitations in the treaty. I am talking about the physical limitations of literally being able to take——

Senator GLENN. I understand. But where we could take it out, put some new brackets on, new wires to make this thing go off, where we could do that and use it in something else, there is no restrictions in the treaty?

General PARTLOW. There may in fact have to be some actual——

General RYAN. After we test it——

Ambassador LEHMAN. Your point is correct, Senator Glenn, that in essence——

Senator GLENN. There is no restrictions on testing them?

General RYAN. No, sir.

Senator GLENN. You just mean that we have to test it as a matter of course? Well, we might or might not, as far as that goes. We might have tested it with a dummy in it or something, I would think.

Why do you think we would absolutely have to test it? That would not be required from anything else except just our own reliability?

General RYAN. Yes, sir.

Ambassador LEHMAN. That is the answer.

General RYAN. To certify it on a different system.

Ambassador LEHMAN. What General Partlow is saying is correct, and your description of the brackets and wires is essentially what we are talking about. But as you know from your own experiences, if you hang a weapon on an aircraft you have certain vibrations you have to consider and you have to go through all of that. So it would not be just bolting it in.

Senator GLENN. I understand.

START

On START I was glad to hear you say you do not want to rush to get this START thing through. I guess one of the things that is most disconcerting to me, and apparently it has worked out all right, was the fact that they were coming across the Atlantic still writing some of the fine print on the INF on the airplane coming over. That is a little bit frightening when we are pushing to get something done because of some summit and all the public relations hoopla, and we are still working out the fine print on the airplane coming over here.

And I hope we are not going to get trapped into something like that on START.

General PARTLOW. They never let me touch anything. But we are essentially initialing the treaty on the aircraft, and in the process of initialing the treaty I believe there was one page which was found to have an error in it, which both the Soviet side, the Soviet Ambassador, and the U.S. Ambassador, agreed to fix.

But we were not still negotiating the treaty on the airplane.

Senator GLENN. That still disturbs me, that you are still finding fine print problems coming across the Atlantic, anyway.

Verification is recognized to be a huge concern in START. It is for me, too. Are we going to see agreements on conventional balances be brought in as part of the START Treaty?

Ambassador LEHMAN. No, sir.

Senator GLENN. There will not?

Ambassador LEHMAN. No, sir.

Senator GLENN. Will the other nuclear powers be brought in on any of this negotiating situation?

Ambassador LEHMAN. No, sir.

Senator GLENN. So it is going to be basically in the INF mold, except for the verification, and the verification will have to be more cooperative, intrusive, or whatever to make sure, and that is what is being worked out, right?

Ambassador LEHMAN. Senator Glenn, if the chairman would permit, I would be prepared to sort of bring you up to date on START, what happened in Moscow and what we are trying to do and everything, on my time or whatever, at the end or now, whichever you would prefer.

Senator EXON. Let us go to the end so we will not use up all of his time.

Senator GLENN. Why do we not do that right now? I will yield the rest of my time if you want to do that.

Senator EXON. Go ahead.

Ambassador LEHMAN. Senator Glenn, as you know, as reflected in the Washington summit statement, we have been negotiating on START for a very, very long time. In essence, it is a continuation of negotiations that have been going on since 1969. But certainly we had the 1982-1983 period and we picked up again in 1985.

The draft treaty that the United States tabled when I was the negotiator for START in Geneva was actually a modified version of the treaty that we had presented to the Soviet Union at a previous negotiation in 1982-1983.

We have come a long way. The achievements are considerable: the 1,600 limit on nuclear delivering vehicles, the 6,000 limit on warheads, the bomber counting rule, the 4,900 limit on ballistic missile warheads, 50 percent reduction in warheads on heavy ICBMs, and the 50 percent reduction in throw weight.

There has been some mischaracterization of what the treaty does in print. But basically, when you look at it it is a very fine structure for the United States, and it really does enhance stability, if it is verifiable.

Now, in the Washington summit statement we got the Soviet Union to agree to the types of verification in general that we will have to have in START, and it was very important, because what it basically says is INF plus. It goes beyond INF in verification.

Now, the Soviets at one time had been saying: Well, if you want to finish up START, in essence you have to take the START numbers and stick them into the SALT II type of verification regime. We have made it clear that for this deeper reduction, for these kinds of limitations, the agreement is going to have to go well beyond that.

Now, we have always insisted in talking with the Soviet Union that verification be negotiated up front. But as you know, that is not always easy to get them to do. In INF it is clear that many of the verification issues the Soviet Union refused to deal with until the last minute, and obviously it was because they hoped that we would make concessions and lower our standards.

In START, the verification is very important and very demanding. In order to avoid the problem we had in INF of the Soviets holding off until the last minute, here is what we did. We had tabled a protocol—it was then called the Protocol on Conversion, Dismantlement, or Destruction; it is now called the Protocol on Conversion or Elimination—before the end of the year last year, before the Washington summit.

We urged the Soviet Union to respond even before the next round began in January with a draft of their own if they felt that was necessary. They did not. When they returned, we tabled our Protocol on Inspection and Monitoring. We have urged the Soviet Union to begin negotiating on specific language for this Protocol as well. They have not agreed to do that.

Now we are on the verge or maybe even have done so today of tabling our memorandum of understanding on data.

What was happening was that we were putting down increasingly detailed and elaborate positions and the Soviet Union was not engaging on the details. As you know, on verification it is the detail that really matters.

Therefore, we had a problem: How do you get them to step up to the problem? We went to Moscow last week, and Secretary Schultz made a presentation to Shevardnadze and to General Secretary Gorbachev that basically said: We believe the only way we are going to get this treaty done in a way that is mutually acceptable, with the amount of work that is left, is if the Soviet Union starts negotiating specific language now up front, now.

So it was agreed that the two sides would develop a joint draft text for each of the two protocols and for the MOU before the next Foreign Ministers' meeting—not complete it, but develop it. That means that either the Soviet Union has got to table their own documents essentially right away—if they have them—or else they are going to have to make a decision to negotiate from our documents, which is, by the way, what they did in the INF case.

Many of our successes in the INF resulted from the fact that the Soviet Union had no time to develop their own documents. They had to negotiate from our document. And so we are trying to force their hand on the details of verification for a START agreement now up front.

We felt that we will know more in a month about whether or not we can get this treaty done in the near term. Now, we have not ruled out the possibility of having a START Treaty completed by the Moscow summit, but we are under no illusions that this will be an easy task.

And what the President was trying to do in his statement the other day is point out that we have got to do it right. We have made a lot of progress, so let us go ahead and try to finish the treaty if we can. But we are not going to rush. We are not going to set the summit as a deadline and make concessions to get there.

If a month or two or three after the summit we conclude the treaty, then maybe we can sign it then.

My own view is that the treaty is far enough along—and when people understand exactly how it works—that a subsequent administration would not reject this approach. On the contrary, they could build upon it, and hopefully it would not take too long to complete this treaty in the next administration.

But if we can do it now, we ought to do it now. But we ought not to negotiate against a deadline, and we must, in short, keep our cool and negotiate firmly.

Let me say frankly that we are in a strong negotiating position. I think the Soviet Union wants that treaty every bit as much as we do and more. I think that right now we have been able to force their hand in ways that would amaze you.

Let me give you a very specific example. [Deleted.]

It does not go as far as we proposed. It is not adequate. But as long as the Soviet Union is prepared to move in the right direction, our view is we ought to keep a step-by-step negotiation going.

I have gone on at length, but I wanted to bring you up to date. There were also in Moscow some indications that the Soviets were prepared to take the 3,300 limit on ICBM warheads, and there seemed to be some flexibility in other areas. We did not lock it in, but there was at least some flexibility indicated.

Senator EXON. Thank you, Senator Glenn.

Thank you, Mr. Ambassador.

I will just remind all here that we are in secret classification. I would remind all the staff that some of the information that we just learned—and I appreciate your forthcoming attitude, Mr. Ambassador—would be much above the secret classification. And I would hope that all here would treat it as such.

Senator Thurmond, do you have further questions?

Senator THURMOND. Yes. Thank you, Mr. Chairman.

TACTICAL NUCLEAR MODERNIZATION

This is a question for General Ryan and General Partlow. There has been some talk about tactical nuclear modernization taking full advantage of the 499 kilometer ground-launched range permitted under the INF Treaty. Do you agree that maximum standoff range is a desirable military characteristic? And how do various Lance follow-on options, including ATACMS, A-T-A-C-M-S, compare in range to what is allowed under the treaty?

General PARTLOW. First of all, if you are talking about only the ATACMS or the ground-launched system, follow-on to Lance, whatever that would be, of course, a tremendous amount depends on what sort of a warhead you have on this system and the size system itself.

The ATACMS is limited to some degree simply by the size of the tube that will fit on the carrier, which is the MLRS carrier.

As a general proposition increased range gives you increased targeting flexibility. Also, it allows you to be further away from the FEBA for your own protection.

So I would say yes, as a general proposition maximum standoff range, among a number of other factors, is probably desirable.

Now, would it be desirable for us to bump right up against the 499 kilometer limit? [Deleted.]

As far as the air-launched system is concerned [deleted].

So, yes, I think for those the maximum realistic standoff range is something that is desirable.

Ambassador **LEHMAN**. Senator Thurmond, as a general proposition, we favor the longer range. But if that is at the expense of the carrying capacity of the aircraft or whether or not it can fit in the right launcher, then you have to consider the tradeoffs.

So if, for example, the longest range tactical air-to-surface missile does not fit on the interior of certain types of aircraft, then we have to decide whether exterior carriage is fine. If it is, then we have to look at how many could it carry. If it could only carry one and we would rather have it carry four, we might have to go for a smaller missile, but that may mean a shorter range. Considerations like that.

Senator **THURMOND**. General, do you have any comment?

General **RYAN**. Sir, only that we would have to consider cost and also what we can do in the relatively near term.

CRITICISM OF SHORT-RANGE TACTICAL NUCLEAR SYSTEMS

Senator **THURMOND**. General Ryan and General Partlow, there has been a recent criticism of very short-range tactical nuclear systems, such as nuclear artillery, because of the potential for escalation should these artillery positions be overrun and faced with a use or lose situation.

How do you respond to such criticism?

General **PARTLOW**. Well, sir, I think again I would refer back to something that Ambassador Lehman said before. With every sort of weapon system you have some advantages and disadvantages.

In the case of the 155 as an example, yes, you have a situation in which the 155 units could be targeted. But one of the reasons that 155 is attractive is because there are so many of these units and they are all nuclear capable. The other side would not know precisely which units had nuclear projectiles.

So let us say they take out some 155 units. They still do not take out all of your nuclear capability.

I also do not believe on a political basis that our strategy is use them or lose them. I believe that we are prepared in our war planning to suffer casualties of nuclear delivery capable systems. We rely on redundancy and other systems to be able to implement the flexible response strategy if we should lose some of those dual capable systems in the conventional part of the battle.

Senator **THURMOND**. General Ryan, do you have any comment?

General **RYAN**. Sir, only that normally we do not forward base our nuclear artillery at the outset of hostilities. So it would be very difficult for an opposing force to determine exactly where our nuclear capability was.

[Additional information follows:]

I would just expand on General Partlow's comments to say that NATO has a great many artillery pieces and they will be spread across the breadth of the battlefield. Artillery, although well forward in order to provide conventional fire support to the infantry and armor, has historically been a strong practitioner of survival skills, such as constant movement, hidden positions, etc. That coupled with the fact that the Soviets must assume that each one is nuclear capable contributes to their survivability.

Senator **Thurmond**. General Ryan and General Partlow—maybe I will go to Secretary Lehman next.

In the recent past, the Congress has linked NATO decisions on certain modernization programs, specifically binary chemical weapons, to the release of funding for the programs. What are your views about such a linkage were it to be applied in some form to tactical nuclear modernization programs?

Ambassador **Lehman**. Senator Thurmond, my own view is that the United States has a number of responsibilities with respect to the procurement of weapons systems that it should do independent of what other governments say. But having said that, obviously with respect to deployments to Europe we have to take into account the realities of the political situation there.

That often requires that we consult closely with the allies. If I could take the example of one of the systems that has been under discussion here, the tactical air to surface missile, [deleted]. If NATO were never to show any interest in TASM, we might make one type of decision, and [deleted].

But we are an alliance and we do consult with our allies, both bilaterally and multilaterally, about what it is the alliance needs, both in the near term and in the long term.

You know that if we buy a fighter plane for ourselves, like the F-16, we make a decision based on what we need. On the other hand, clearly the F-16 has become one of the most amazing multinational programs. And so there are other considerations.

When in doubt, you look to your own interests first.

Senator **Thurmond**. Mr. Chairman, I just have one more question if I could.

Senator **Exon**. Go ahead.

SRAM II

Senator **Thurmond**. General Ryan, the short-range attack missile, SRAM II, now under development for the strategic bomber forces, has been suggested as a candidate for a tactical air-to-surface missile. What aircraft systems are envisioned to carry tactical air-to-surface missiles and is compatibility with these aircraft a developmental goal of the SRAM II program?

General **Ryan**. Sir, at this time we would envision the [deleted]. But I must tell you that it has not been integrated at this time. That is a task left to be done.

[Additional information was submitted and is retained in committee's executive files.]

Senator **Thurmond**. Thank you very much, gentlemen.

Mr. Chairman, I have got to go. If you will excuse me.

Senator **Exon**. Thank you, Senator Thurmond.

Senator Levin, do you have any questions?

I would just say, Senator, we have been going on now for almost 3 hours. I am about ready to close down. I think the witnesses have been very, very forthcoming and very helpful. They must be getting a little bit weary.

Senator **Levin**. I understood it was only 2 hours, Mr. Chairman.

Senator **Exon**. It has been longer than that we have been here.

I have one last question, and I am going to limit myself to a minute to try to get things wound up here, because you have been very gracious. And it is of you, General Partlow. You indicated earlier in kind of an aside comment that just as of today there was an indication that the Soviets may be modernizing and going through some force modernization themselves.

I was just curious. Could you expand on that briefly? Is this in the ballistic missile area, artillery, or what?

General PARTLOW. I am not sure of the level of classification of that information.

[Deleted.]

What they would or could do with it is too early to tell. The point I was trying to make is that I personally, and I think our analysts, do not believe that the Soviets are going to allow the INF treaty to impede their modernization of their sub-500 kilometer systems in any way, regardless of what they may be saying on a political level at this time.

Senator EXON. I have no further questions. Senator Glenn.

Senator GLENN. I do have just a little follow-on on the verification on START. Have you tried or thought about just exchanging data on the missiles? In other words, we give them all the data on ranges, warheads, and so on, and they give us theirs on new missiles?

Because here is the situation. We started out so secretive on both sides, and we were supposed to be able to ferret out the information, and we did. And we did a rather remarkable job on it.

But meanwhile, they can encrypt the telemetry. And actually, you don't need the telemetry anyway. You can put a data package on board, but their engineers are just as dumb as ours: They like to see the needles jump while the test is on, and I understand that. I would love to watch that in a blockhouse myself.

But they do not really have to have that. You could make a data package and bring it back. You would just get it 48 hours later, that is the only difference. You get all the information back, and so telemetry does not do you a darn bit of good to begin with.

And they encrypt it, and so we go through all this mish-mash. Also, the number of tests. If we are not going to exchange data, then we have to have a requirement for a certain number of tests all-up with all the warheads on board, and have that agreed to in advance, so we then could monitor what they are doing and they could monitor what we are doing, if we are going to be honest about this.

And I do not know whether we have a requirement for TM, but it just seems to me that, in this new perestroika, glasnost, whatever we are calling this new era that we are in, that maybe we just say, if we develop a new weapon we will give you the data on it, and if you develop a new weapons system you give us the data on it, and save all this trouble on the requirements of TM and requirements of flights.

Back when I was involved in the space program—and I do not like to bring my personal experience into this—but to make a reliable missile it required 40, 45 flights, and then you were still uncertain if you had 45, and a third of them were blown up and all that sort of thing back in those days.

We worked that down with computer modeling experience to where we were ready to deploy after three or four flights. We will refine the data on the missile, but we do not have any doubts about it. We are going to deploy it. And the Soviets could do the same thing now.

And so the requirement for testing on each side, because we are so good at it, and they are, too, has gone way down. So to rely on testing only for the indefinite futue of START to me is a very, very sketchy way to go.

And you have the other problem of verification, too, of course, since we are not eliminating whole missile classes, how do you identify the specific numbers. [Deleted.]

It was identifiable as a fingerprint to a human being is on a particular piece of equipment. And so there are some things moving in that particular area.

But I would suggest that you try that out on them. We will give them the data, they give us, if we develop new systems on this, because lord knows we will spend billions trying to ferret out that same kind of information, and they will do the same thing. Well, no, they get a subscription to the Congressional Record and Aviation Week and they have got most of their job done for them.

But we will have to ferret it out anyway. And we cannot be guaranteed we can do that kind of a job, which means that is part of verification.

So if they are willing to share information, give it to us up front, and we will give it to them up front, and let us move on into perestroika.

Ambassador LEHMAN. Senator Glenn, I am glad you asked, because in my description of START, I forgot to mention one of the important initiatives we also took last week in Moscow. Based on discussions with the Joint Chiefs, we have come to the conclusion that, to have greater confidence that we can work out the right verification provisions and to have greater confidence that the treaty is going in the right direction, we should propose to the Soviet Union—and we did last week--two types of data exchange. One is to begin exchanging data on the numbers and types and characteristics of systems that will be covered by the treaty.

But the second, which is more related to the examples you were given, is to recognize that to design the right provisions and to agree to the right provisions, we need to have a better understanding of the, if you will, life cycle of the procurement and deployment of Soviet missiles. We have proposed that just such a data exchange take place.

They would not agree to put it in the joint statement, [deleted]. So we are hoping that before the March 4 ministers meeting we may even begin to see the early exchange of data.

Senator GLENN. Well, that is very good.

Mr. Chairman, just a 30 second comment here. I wish all our hearings were as forthcoming as this has been. This has been very good this afternoon. I appreciate it very much.

Senator EXON. Thank you, Senator.

Senator Levin.

Senator LEVIN. Just one question. Have we gotten any feedback from the Germans as to the Secretary of Defense's commentary at

Wehrkunde, in which he linked modernization to the continuation of American troops? Were we told by Kohl that that could be counterproductive and put him in hot water politically at home?

Ambassador LEHMAN. No, Senator Levin.

The Secretary's statement was not per se a linkage. He simply was pointing out: that nuclear weapons play an important role in keeping the peace, not simply because there is a conventional imbalance, but because nuclear deterrence itself has helped keep the peace; that together there are a number of important roles that nuclear weapons play, and it is not simply the presence of American troops in Europe which deters; and that if someone is talking about creating a world in which there is sort of a nuclear-free, but terribly dangerous, conventional Europe, any Secretary of Defense, I think he worded it, would have to examine that very carefully whether or not he could responsibly leave U.S. forces in Europe without the weapons that are necessary to keep the peace.

It is more in that tone that he put it forward. Earlier we had a bit of discussion and I said that one caricature of the importance of nuclear weapons to keeping the peace was the notion that when the last soldier in the Warsaw Pact turns in his last bayonet, the last American artilleryman turns in his last nuclear artillery shell.

That is a bit of a caricature, but it is a caricature that is designed to point out this important role that nuclear weapons have played.

Senator LEVIN. My question was not doubting the importance. My question only had to do with whether there was any feedback from Germany.

Ambassador LEHMAN. I would say, Senator Levin—and I have tried to make this point in a number of different ways in response to different questions here—there is, as always, a great nuclear debate going on right now. Already all the signs are clear that the answers that people are turning to are basically the solid, sound answers that we have had in the past.

That is not to say we do not need to make adjustments in our forces or refinements in our strategy and our tactics or that we cannot exploit new technologies or new ideas. But I think the tide is receding on some of the more extreme ideas, including the singularity concept.

Senator LEVIN. Thank you, Mr. Chairman. That is all.

Senator EXON. Ambassador Lehman and General Partlow and General Ryan, I cannot remember a hearing that has been more forthcoming or where we have received more direct answers to the questions that have been posed. You have been here with us for going on 3 hours now.

Thank you for a very interesting hearing. I think it is going to be very helpful to this committee. And good luck on your upcoming negotiations with the NATO allies and with the Soviets.

[Questions for the hearing record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

Senator EXON. In your testimony, you indicated that about [$21 million] would be needed this year if a decision were to be made to go beyond the congressional cap of 925 modern AFAPs. Can you explain in detail how the funds will be used?

Secretary Lehman. Congressional authority to produce additional, modern W82/155mm AFAPs would facilitate incorporation in the fiscal year 1990 DOD budget to be submitted in January 1989. The money is needed in order to use active production lines to avoid delays and costs associated with a break in production. The money is needed to continue the production line where W82 fuzes are fabricated. In addition to fuzes, DOD funds pay for rocket motors, fuze setters, containers and control units.

Senator Exon. What are the numbers and types of NATO DCA that stand on "nuclear alert" in peacetime? Will that number change after the P-II and GLCM are withdrawn? What numbers and types of aircraft will be maintained on nuclear alert in crisis or in the event of conflict?

Secretary Lehman. [Deleted.]

Senator Exon. What is the relationship between the WS^3 construction program and the aircraft shelter improvement you mentioned in your testimony? Must the shelter improvements be accomplished in conjunction with the vault construction? Are both programmed on the same NATO Infrastructure funding track? What is the total cost of both programs and what is the U.S. share?

Secretary Lehman. There is no direct relationship between WS^3 and the hardened aircraft shelter (HAS) program. The WS^3 program places weapon storage vaults in HAS floors. The ongoing HAS program consists of construction of new shelters and improvements to existing shelters. These two programs do not have to be accomplished together, although actual construction may overlap in some cases. The two programs are not programmed together in terms of NATO infrastructure funding.

The WS^3 is a $260–270M program. The Congress has agreed to prefinance the program with the stipulation that eligibility for NATO infrastructure funding be received prior to construction/installation. We expect to achieve eligibility from NATO in the near term. The recoupment schedule will be determined after eligibility approval.

[Deleted.]

Senator Exon. Your testimony highlighted the advantages of a dual-capable ATACMS in terms of personnel, logistics, training, and survivability. Have you considered the risk that some future nuclear arms control negotiation might lead to limits on the launch vehicle, the MLRS, and thereby compromise an indispensable conventional capability? How do you assess the risks and benefits, compared to a straightforward "new LANCE" program?

Secretary Lehman. We have considered the relationship between the follow-on to LANCE (FOTL) program and possible future arms control negotiations. We oppose beginning negotiations on short-range nuclear missiles (e.g., LANCE or the FOTL) for a number of political, military, and arms control reasons. One reason is that any limitations would have an adverse affect on NATO's conventional capabilities if the FOTL is deployed as a dual-capable system (e.g., if ATACMS is given a nuclear capability). Alternatively, the prospect of negotiated limitations on short-range nuclear missiles could lead NATO to deploy a nuclear-only system, which would probably be more expensive, require additional force structure, and perpetuate the current situation where NATO's short-range missile capability is concentrated on a small number of distinct launchers, constraining its overall survivability. A high degree of survivability must be a key characteristic of the FOTL, since it will be the only theater-based missile capability committed to NATO following elimination of INF missiles.

It is important to realize that a conventional-only ATACMS would not necessarily be exempt from limitations on short-range missiles. The INF Treaty, for example, eliminates all intermediate- and shorter-range missiles, whether they are armed with nuclear or conventional warheads.

Senator Exon. We are adjourned.

[Whereupon, at 4:47 p.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

TUESDAY, MARCH 1, 1988

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES
AND NUCLEAR DETERRENCE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

STRATEGIC DEFENSE INITIATIVE (SDI)

The subcommittee met in executive session, pursuant to notice, at 2:10 p.m. in room S-407, The Capitol, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Nunn, Levin, Glenn, Warner, Thurmond, Wilson, Symms, and McCain.

Staff present: Arnold L. Punaro, staff director; Robert G. Bell, Robert F. Bott, Brian D. Dailey, Sherri Wasserman Goodman, William E. Hoehn, Jr., Ronald P. Kelly, T. Kirk McConnell, professional staff members; and Mickie Jan Wise, staff assistant.

Also present: Gregory J. Weaver, assistant to Senator Levin; William J. Lynn, assistant to Senator Kennedy; Milton D. Beach, assistant to Senator Glenn; Terrence M. Lynch, assistant to Senator Shelby; William J. Wight, assistant to Senator Warner; Henry D. Sokolski, assistant to Senator Quayle; Mark J. Albrecht, assistant to Senator Wilson; Anthony H. Cordesman, assistant to Senator McCain.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. The subcommittee will please come to order.

This afternoon, the Strategic Forces and Nuclear Deterrence Subcommittee of the Armed Services Committee meets for its second hearing in review of the administration's fiscal year 1989 Defense authorization request. Today's hearing is the first of three we have planned on the Strategic Defense Initiative.

The focus of today's hearing is, first, on the military requirements for strategic defenses and how they were established; second, on how SDIO intends to meet those requirements in the Phase I program plan and architecture; and, third, on the status of the Phase I program plan.

I wish to stress that this hearing is not about budgetary or other issues specifically related to the fiscal year 1989 request or to SDIO's adjustments to the fiscal year 1988 appropriation.

There will be a return engagement by General Abrahamson on the afternoon of March 21, where we will learn about the changes that have occurred in the SDIO's fiscal year 1989 request since last year and about the specifics of the request since last year and about the specifics of the request itself. At that time, we will also receive testimony on testing and compliance issues.

Last year, the establishment of the military requirements for the strategic defenses and, indeed, the Defense Acquisition Board's Milestone I program for Phase I Demonstration and Validation occurred after the committee had finished the budget markup. This budget cycle is the first opportunity that we have had for reviewing these important developments.

We will be hearing today from two very distinguished and outstanding witnesses. We are very pleased that both of them could agree to arrange their schedules to be here at the same time.

They are Gen. Robert T. Herres, the Vice Chairman of the Joint Chiefs of Staff, and Lt. Gen. James Abrahamson, Director of the Strategic Defense Initiative Organization.

General Herres will describe the military requirements of the process, and General Abrahamson will relate those requirements to Phase I programs.

Before I call on the first witness, I would like to announce that Senator Thurmond has been delayed. He has asked that I submit his opening statement for the record, which I will do now, if there is not objection.

Without objection, it is so ordered.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT OF SENATOR STROM THURMOND

Thank you, Mr. Chairman. I join you in welcoming General Herres and General Abrahamson to our hearing this afternoon. The committee holds each of these gentlemen in very high regard. Their testimony today will be a fitting start to building the record that we will establish this year on the important issue of strategic defense.

I believe it is entirely appropriate, Mr. Chairman, that we begin our consideration of the SDI with the Phase I program, including a consideration of the JCS requirements for Phase I. In many respects, last year's review of the SDI program by the Defense Acquisition Board represented the normalization of the program. It begins an acquisition process for a Strategic Defense System that makes clear the relationship between Phase I technologies and advanced technologies in a phased development and deployment process. It provides a framework wherein strategic defense system elements and program milestones can be tied directly to the budget.

In that regard, Mr. Chairman, I was disappointed, but not surprised, to read that the cumulative effect of the fiscal year 1988-1989 budget reductions has been to delay the development milestone for Phase I by at least a year. Perhaps General Abrahamson will have more to say about that in our second hearing, which will address the specifics of the fiscal year 1989 program.

Mr. Chairman, since our last subcommittee hearing on the SDI program, Senator Nunn has spoken of an alternative near term objective for the SDI program, specifically a defense against accidental launch of ballistic missiles. This clearly would affect the requirements for an initial strategic defense system, but it is less clear how the initial system architecture would differ for this more limited objective. I look forward to today's hearing as the first of several opportunities to have General Abrahamson and General Herres address these issues.

Thank you, Mr. Chairman.

Senator EXON. I would like to ask the other members of the subcommittee if they have any opening statements.

Senator Glenn.

Senator GLENN. No, I have no statement. I just look forward to the testimony.

Senator EXON. Senator McCain?

Senator MCCAIN. I have no statement, thank you.

Senator EXON. Thank you very much.

We will proceed at this time with General Herres, and thank you for being here.

STATEMENT OF GEN. ROBERT T. HERRES, VICE CHAIRMAN, JOINT CHIEFS OF STAFF

General HERRES. Thank you very much, Mr. Chairman. I appreciate the invitation and the opportunity to discuss this very important issue with you all.

You should by now have my prepared statement. I apologize for its tardiness. We did get it over here late. We had a little trouble getting all the "t's" crossed and "i's" dotted. Nevertheless, it should be in your hands.

I would propose, rather than to try to read it, to summarize and just kind of walk you through where we came from with this requirement, how the JCS entered the requirements development picture, a little background, and then just basically what the requirements say, if that satisfies you.

Senator EXON. General Herres, thank you very much. Without objection, your full statement will be accepted for the record. If you walk us through, summarize, or use whatever phraseology you would wish on your statement, that would be helpful.

General HERRES. Thank you very much, Mr. Chairman.

There is a little bit of confusion about the responsibility for requirements and how the military requirement enters the picture in this program. So I think a little background is important.

In the early days of SDI, we need to remember that the initiation of the program constituted the initiation of a research effort, research of the technologies which could lead potentially to the development of systems which could provide for strategic defense capabilities.

So, in the early days of the program, we felt it important that this research not be constrained by the definition of operational military requirements in any specific terms.

But it was also clear that at some point, operational guidance and the development of requirements would be necessary.

So, in General Abrahamson's charter, which, as I recall, was first developed in 1984—it has been since amended; the most current version is 1987. In his charter, which is a DOD Directive, the responsibility for providing operational guidance and operational requirements to the SDIO was assigned to the Joint Chiefs of Staff. That has been since amended, subsequent to the Defense Reorganization Act of 1986, to read that the Chairman now has that responsibility.

The concept through that period of time had been that, as the management of the research projects continued under the direction of the SDI and as the definition of the management of all that took place, we would watch the maturing of the technologies that General Abrahamson's program would explore, and, as that maturing reached an appropriate point, we would then enter the requirements development process.

We did that last year. Just about a year ago this time, we began the requirements development process. We saw that technologies were nearing maturity, to the point that requirements would be an ingredient and something that would be needed before a development process could begin. By "development," I mean the development of the technologies into employable systems.

The first step was to develop a joint mission needs statement, which is normally what we do at Milestone Zero in a program's life. The joint mission needs statement's approval constitutes the initiation of a concept exploration phase.

But we had really been in concept exploration for some time at that point. Nevertheless, the SDIO did have guidance in the form of DOD directives and National Security Defense Directives from the White House.

What we did with the joint mission needs statement is codify all of that, review it, and put it in the format and in the structure that we felt would be necessary to form a joint mission needs statement, and the JCS approved such a document about a year ago.

This, of course, codified the existence of the concept exploration phase, as we know it in normal programs. The next step then, of course, would be the development of specific requirements as we approach the development decisions.

Now, one of the things that I think is very important to remember about SDI is that we have a whole range of technologies, and the maturity of those technologies ranges throughout, if you can visualize a sort of time-phased arrangement, from the earlier stages of concept exploration all the way up to the point where definition of a system is possible. We have technologies in the program which General Abrahamson has been managing that are at all stages of maturity between those two extremes of concept exploration.

The mission needs statement has the purpose of defining the needs for the exploration of those technologies. That really is what it is all about.

There are no surprises in the mission needs statement. You have all heard the kind of words that are in it many times in the defense of this program and the advocacy of this program.

At the Milestone I point, which is the conclusion of the concept exploration phase and the beginning of a concept validation phase, however, it becomes necessary to have an operational requirement with some degree of specificity.

After we had approved a joint mission needs statement and sent it to the Secretary for approval, we then became engaged in the process of defining a Phase I deployment requirement.

This would be a requirement which would describe the capabilities the Joint Chiefs of Staff would feel would be necessary from the initial phase of the initially deployed element of a strategic defense system.

And so, at the end of the process of doing all of that, a requirement did emerge and was forwarded to the Secretary, and has been approved by the Chiefs and the Secretary.

Senator EXON. What was the date of that?

General HERRES. It is June 23 for that requirement.

Senator EXON. Last June?

General HERRES. The JCS, yes, sir. The mission needs statement is May 15, and the requirement is June 23.

The first problem, of course, is to define an objective, a specific objective for this Phase I system that has military utility. The objective, of course, is deterrence, to define a way in which this Phase I system can make a militarily significant and useful contribution to deterrence.

It is not an easy thing to do because what we really had to do was to take a concept and somehow or other convert that concept into numbers, to quantify it, so to speak, in terms of some quantifiable capabilities, so that we could then turn to General Abrahamson and say we would like for you to see if you can build something with these kinds of quantifiable capabilities.

[Deleted.]

We also recognized that in all such things, the problem of scenarios looms large and quickly. Unfortunately, in subsequent debates, the scenario often becomes the object of the debate more than the things that result from the scenario.

We knew that would happen in this particular case.

So, we tasked DIA to work with the intelligence community to establish a baseline threat with the guidance recognition that the baseline threat would not necessarily be the definitive threat or certainly not the only threat with which the system that we had in mind would have to deal; but that it would be a representative threat, and "representative" is the key word. It would be a model such that any realistic scenario would be close enough to this threat model quantitatively that the capability to deal with this threat model then would inherently mean the capability to deal with any scenario in that ball park, if you see what I mean. I know that is a little bit vague.

The idea here is if you can win that ball game and defeat that kind of threat, you are going to be able to defeat anything that is realistic because, whatever else is realistic in the way of scenarios cannot be very far away from this particular threat.

There is at least as much uncertainty surrounding the numbers you would call up for protection, in this case [deleted] years in advance, as there would be in deviations of the scenarios themselves.

So, a [deleted] threat model was developed, based on a projection for a [deleted] Soviet force structure.

The first assumption was no treaty. If there is to be a treaty, then it will only facilitate the problem. It would make General Abrahamson's problem an easier problem to solve, I am sure, but still a realistic problem.

[Deleted.]

I can discuss the details of that; but that is kind of the broad picture of that threat.

This includes SLBMs and ICBMs and a predominantly MIRVed force.

[Deleted.]

Now that, in some regards, makes General Abrahamson's problem a little bit harder than would have been otherwise the case.

Nevertheless, we felt that that was the best way to deal with the problem of the proper mission for the first phase of the system's deployment.

Another consideration behind all of this—and to some extent I may be doing this backwards by working at the top end of the size of the attack and working down—is that there are other things that can be achieved by a Phase I deployment, and there would be very useful objectives to try to meet, with a lesser sized strategic defensive deployment.

[Deleted.]

Senator **Exon**. General, could I interrupt you for just a moment.

The vote that has just been announced is on the motion to proceed on the polygraph testing bill. We have a few more minutes.

Would you prefer, General, that we take a temporary recess now and go down and cast our votes?

About how many minutes are you from concluding your presentation?

General **Herres**. I'm about 3 or 4 more minutes from fininshing it up.

Senator **Exon**. Then go ahead, please.

General **Herres**. Okay.

[Deleted.]

So we recognize that that should be the outside boundary of our requirement, and in meeting that requirement, we would be able to achieve capabilities against these other [deleted] possibilities.

[Deleted.] I know this is a much discussed matter, and I might as well point that out at the outset. It was discussed in our paper and it is clearly stated in the requirement

[Deleted.]

This, gentleman, sums up the requirement, and basically what the requirement says. It is a fairly simple requirement, straightforward, but we think it is comprehensive enough to give General Abrahamson good targets to shoot at, in establishing a systems concept definition for the Phase I deployment.

[Deleted.] They are now working on another level of detail behind this overall broad requirement, which would subsequently be reviewed by the Joint Chiefs of Staff and then submitted to the Secretary for approval.

That kind of sums up where we are and where we have been with this requirement, and I am looking forward to your questions.

[The prepared statement of General Herres is retained in committee files.]

Senator **Exon**. Thank you very much, General.

I think it would be appropriate at this time if we would recess for 5 minutes so that we can all go down and vote.

We will be right back.

[A brief recess was taken.]

Senator **Exon**. The subcommittee will please come to order.

General Herres, thank you very much for your great summary of your prepared statement.

My suggestion is that it probably would be best, if it is the will of the committee, that we would now go with one round of questioning, with the usual 6-minute rule in effect, and then we will go to General Abrahamson. If you can stay through the entire briefing and hearing, sir, we would appreciate it. There may be other questions of you later, General.

General HERRES. I would be glad to, sir. Yes.

Senator EXON. If that is acceptable to the committee, we will proceed on that kind of basis.

General, let me start out by zeroing in on some of the figures that you gave us.

[Deleted.]

What I am trying to get at is a general question that you could ask in somewhat of a specific way. I guess my question deals with the fact that, if I were designing a plan like this, I guess I would say well, [deleted].

How did you arrive at that figure, and how meaningful is it?

General HERRES. Well, it is purely a judgment.

We did use a benchmark to help calibrate our judgment a little bit, but you struck on the qualitative aspect of this whole thing.

As I mentioned earlier, there is the difficult problem of how to translate an elusive, conceptual term like "deterrence" into some numbers. We recognized early-on that that was going to be very difficult.

I just have to tell you, frankly, that it is in the end a value judgment. [Deleted.]

Now, there is a benchmark. [Deleted.]

Senator EXON. [Deleted.]

General HERRES. [Deleted.]

Senator EXON. [Deleted.]

General HERRES. [Deleted.]

Senator EXON. [Deleted.]

General HERRES. [Deleted.]

Senator EXON. [Deleted.]

General HERRES. [Deleted] and if we knew he could do that to us, would we consider under any circumstances such an attack? The answer is clearly no. That is why we made that judgment.

Senator EXON. Let me ask you this, General. [Deleted.]

General HERRES. [Deleted.]

Senator EXON. But what I am saying is this. [Deleted.]

General HERRES. I understand the question. [Deleted.]

Without foreclosing on what the final architecture of the system might look like in terms of command and control, those things would have to be worked out.

But I can intuitively visualize that we would be able substantially—not "substantially," but to increase our responsiveness enough to make a difference, [deleted].

However, there is another side to that, though, and that is that the attack scenario that we have defined might not be valid for that particular case. In other words, I said a "representative scenario." [Deleted.]

So it would probably be a wash.

That is just Bob Herres' judgment, based on a qualitative issue.

Senator EXON. Thank you, General. That last bit of explanation did not allow the Chairman in good conscience to sneak in a second question after his time had expired, so I recognize Senator Thurmond.

General HERRES. I apologize for that, Mr. Chairman.

Senator THURMOND. Thank you very much, Mr. Chairman.

General Herres, what effect would a reduction in the Soviet ballistic missile force, such as is proposed in the current START negotiations, have on the JCS requirement for a Phase I strategic defense system?

General HERRES. We would certainly look at it again, but I don't anticipate that we would make any changes.

Our requirement is stated in percentages. I think it would have an effect on the response to the requirement. It would make General Abrahamson's job I think a little easier.

I am not sure that it would be as much easier as a lot of people might expect, but it certainly would be easier, [deleted].

DEFENSE AGAINST ACCIDENTAL LAUNCH

Senator THURMOND. General Herres, have the Joint Chiefs of Staff given any consideration to reducing the near-term requirement for the strategic defense system to a defense against accidental launch?

What are your views of this more limited objective as a first step in a phased approach to a strategic defense system?

General HERRES. No, sir, we have not as a separate requirement. [Deleted.]

Therefore, we see no need to address the accidental launch as a separate requirement.

Now, in your follow-on question, as to whether or not being able to deal with an accidental launch might be a good first step, to lead to fulfillment of this requirement, that is an interesting possibility, particularly if one's acquisition strategy is such that we ought to start with an even more modest deployment in the Phase I.

We kind of carved the Phase I out as a modest system initially, and really had not thought in terms of a substructure, short of a Phase I. That certainly is not an unrealistic possibility, and it is probably an idea that has enough merit to really take a good hard look at.

The idea that maybe you could take these [deleted] scenarios or [deleted] threats that I talked about, from the least severe threat in terms of defensive capability to deal with it, on through to the most severe and then gradually let your system build up through stages until it reached that Phase I capability, that certainly is a possibility. I think it could be looked at and it might turn out to be a useful approach.

I would suggest, however, that, as we do that, the best way would be to iterate the debate back and forth between ourselves and the SDIO because what you are dealing with is the art of the possible and in a number of different ways—technically, politically, environmentally and so forth.

Senator THURMOND. General Abrahamson, do you believe that an effective accidental launch protection system can be developed and deployed within the limits of the ABM Treaty?

If not, in what respect would an effective accidental launch protection system be outside of the ABM Treaty?

General ABRAHAMSON. Senator, we are right now trying to take a constructive approach to what technical possibilities there are to respond to that kind of requirement should there be a requirement and a national or a policy decision that that is an important first step on the way to Phase I or ultimately what the long-term objective of the program is.

We have outlined at this point a series of technical options that can be built on where we are in the program. And there are some treaty issues. It is not really my judgment or my responsibility to try to make a treaty judgment. But they fall in several different areas.

The first one falls in the area of [deleted].

I cannot know what the final resolution of that might be or how the various legal judgments about that might come together. But I think that that is the most significant problem. The kind of technologies that we would propose for an accidental launch would be the kind that are built on ground-basing and one would start somewhere within the limits of 100 launchers that are outlined by the ABM Treaty.

So, the issues would be the [deleted].

I believe we have several options, and as I indicate, we are looking at it very carefully now. So policy-makers and strategists could look at this range of options and then make that judgment about whether or not it can really fit within the treaty.

But the first issue is [deleted].

Senator THURMOND. General Herres, do you have any comment on that?

General HERRES. The one thought that I would add is it probably would make a difference—and I shouldn't be putting myself into a position of rendering a judgment on this because it certainly would be a legal issue in the end—it could make a difference as to whether or not the accidental launch protection system requirement is the end requirement or if, as you structured your first question to me, it is the first phase of a system that leads to the kind of system our requirement calls for, as to whether or not it would be treaty compliant.

It probably would be an issue. I don't know. That is the one thing that I would add.

Senator THURMOND. Thank you very much. My time is up, Mr. Chairman.

Senator EXON. Thank you, Senator Thurmond.

Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman.

I find myself a little bit confused as to what is going on.

ADVANCED DEFENSE TECHNOLOGIES

In 1985, the administration stated in a report to Congress on the initiation of the SDI program that the goal of the SDI was to conduct a program of vigorous research, focused on advanced defense technologies that may lead to strategic defense options.

Now, last September, General Abrahamson informed this committee by letter that the Secretary of Defense had approved selected SDI concepts and technologies to enter the demonstration and validation phase of the DAB process, and stated in his letter that this is not a decision to either develop or deploy strategic defenses.

Now today we learn for the first time, or I learn for the first time, on June 23, the operational requirement was put in by JCS. We had a letter on September 18. Now we learn that as part of that Milestone I decision, JCS established the joint mission needs and established a requirement for a first stage deployment basically.

General HERRES. No, sir. May I explain that?

Senator GLENN. Let me first continue.

It says that we establish a requirement for the first phase strategic defense system.

Now, the JCS requirements, it appears to me, and not the technology, drove the architectural solutions that are being used in Phase I validation, [deleted].

I supported the SDI research program and still do. I have worked hard for research money for this thing on the committee and even before I was on this committee.

At that time General Abrahamson sat in my office a couple of times and at other times and talked about how we were not going to try to deploy and of this until we knew all of our technology because it did not pay to go with a partial system. It would not be good enough. The Soviets had too many RVs.

Well, I bought that, lock, stock, and barrel. I still do.

I have been out to some of the places in the last couple of months and I have talked to the scientists involved with this program. They are still talking about the technology. It is a whole system. But they don't know where it is because we have not developed it that far yet. They don't know whether it will take 10, 15, or 20 years to develop—there is not a single person that I have talked to who is out there, working on the project, who can give you an estimate any closer than that.

And yet, here we are, starting to go on the comparatively extremely expensive effort to deploy the system.

I find myself a little bit lost here. I don't know whether we have been sold down the river.

I bought the whole concept that we were not going to move ahead with this until we saw that the whole thing could fit together in one great, big picture. We cannot see that now.

And yet, here we go, starting with some deployments.

Where am I wrong?

General HERRES. Let me explain. Your expectations have not been violated.

Let me explain this with one brief amplification of this.

Milestone II is the development decision. We are some distance from Milestone II at this point.

The requirement is a necessary antecedent of the Milestone I decision because Milestone I is where a developer defines a system concept at the end of the concept exploration phase.

At that point, then, with the requirement to match against the system concept definition, if he gets approval—now, he has not had a tasker yet for Milestone I. We have had a Milestone I review, but there is still some flexibility as to system concept definition.

When he gets a tasker at Milestone I, he will be authorized to proceed with validation of that system concept, but not with development. Full scale development does not begin until a subsequent milestone is met, and that is at the Milestone II point, when he completes concept validation.

Senator GLENN. Well, we are in Phase I. Is that not correct?

General HERRES. Well, there is some confusion. Phase I of the SDI program is one thing, and we have these different phases of the acquisition cycle in the DOD Directive, between Milestone Zero, Milestone I and Milestone II. It is easy to get those confused.

We are in the phase that lies between Milestone Zero and Milestone I with the Phase I system.

The requirement and a system concept definition that matches it will be when they come together and get approval. Then you move ahead into the phase that lies between Milestone I and Milestone II for the Phase I system.

The other technologies are still in the concept exploration phase.

Senator GLENN. I am still not sure that I know where we are yet.

General HERRES. You should have a diagram.

Senator GLENN. I do have a diagram here.

Are we in Phase I or aren't we?

General HERRES. I guess, Senator, that I need to be sure that I understand what you mean by Phase I.

Senator GLENN. Do we have different milestones within Phase I? Is that the idea?

General HERRES. Well, for Phase I of the SDI program—we probably should have named it something else. If we did not call it Phase I, if perhaps we should have called it the "initial increment of an SDI system," or "first deployment segment" or something like that. You get them confused with the phases of the acquisition development cycle.

Senator GLENN. Can you tell me why we didn't know about the JCS establishing the requirement? That was last June.

What was the reason for keeping that quiet?

General ABRAHAMSON. I don't believe that it was ever intended to be quiet, sir.

Senator GLENN. Did anybody else on the committee know about it, that the JCS made that decision last June 23?

Senator NUNN. What decision, John?

Senator GLENN. To establish an operational requirement for this.

Senator NUNN. I have known it in recent weeks, but I didn't know it last June.

Senator GLENN. It was June 23. I find that a little bit disturbing in itself, when we do something to make a step that large, and the JCS does not let us know about it at all.

General HERRES. Well, I thought there was a particular understanding that we were putting the SDI program under the normal acquisition procedures into the DOD acquisition system.

As I said, the development of a joint mission needs statement is the first step in the requirement side of that.

Senator GLENN. To my knowledge at least—and I may have missed a meeting—but to my knowledge there was never a JCS establishment of a requirement that we were aware of.

Ordinarily, that means that they have signed off sort of on the technology in establishing a requirement.

General HERRES. No, sir.

Senator GLENN. Well, yes, because they don't just go out and establish a requirement without having some idea that that requirement can be met with hardware. You know, if it is that easy to establish a requirement, let's just establish a requirement and do away with war. They don't establish a requirement without having some idea of how we are going to reach that requirement.

So that is where I feel a little bit let down here. I think we have been left in the dark on this matter, and I think that is unfair. And I think we are moving rapidly along here with requirements that are kept quiet and movements to different milestones or whatever, and we are going to deployment is what your objective is. And we are not holding up because, as Abe told me personally many times, until we get the technical capability to do these things.

My time is up.

I would suggest, Mr. Chairman, that sometime we have them run through exactly how this whole thing is supposed to work [deleted] and see what the technology is that will do that right now.

Senator EXON. Thank you, Senator Glenn.

Senator Symms.

Senator SYMMS. I just want to comment to Senator Glenn. You know, my memory may be a little foggy, but I thought we did have briefings on this last year.

Senator GLENN. I don't remember any JCS requirement that I was ever briefed on. I don't think we did.

Senator SYMMS. When I took some trips out to visit some of the plants, they talked about operational plans.

Senator GLENN. Oh, they talk about it all the time. But this is not the JCS requirement. This is a formal action of the JCS now, laying an operational requirement on SDI. That is something that is brand new to me.

Senator SYMMS. Somehow it struck me that we had had some briefings on it. but I guess I would have to go back and check the record.

General, the question that I want to ask you is straight up.

Is this requirement that you have laid out in your statement a tough requirement to meet?

General HERRES. It will be pretty tough, yes, sir.

Senator SYMMS. The threat assessed for [deleted] with this multivehicle launch is a tough thing to meet.

General HERRES. Yes, sir. It won't be easy. I just need to reemphasize one more time that no decision has been made yet that it is achievable. You know, this is what the process is. This is what the acquisition process is all about—first, explore the concept; then validate the concept that matches the requirement. At the end of that phase, take a look at it and see if it really can be built. Then you go into full-scale development. Then, take one more look before you go into production.

So there are three decisions that lie between this requirement and actual deployment—three conscious decision points. Incrementally, as you do work, then you reexamine; then you do work and you reexamine.

SOVIET COMMITMENT TO CIVIL DEFENSE

Senator SYMMS. There has been a lot of reports over the last 2 years that the Soviets have a big commitment to civil defense and people protection in their country and the ABM violations, and now reports are starting to come out—I am going to be involved in a briefing, I think it is Thursday, Senator Boren and the Intelligence Committee set up an Air Force briefing on the Air Force's opinion on a Soviet breakout of ABM.

It is been pretty obvious, even to a layman, that the Soviets are working toward a breakout of ABM at some point in time in the future and are building their own civil defense system and some kind of ballistic missile system for defense.

If, in fact, the "Wall Street Journal" article has any truth to it, where does that put us? Would you care to comment on what was said in the paper last Friday?

General HERRES. That was an erroneous report. The Air Force has not made a judgment.

The Air Force Chief of Staff called me, as a matter of fact, to tell me to make sure that we understood down in the joint arena that the Air Force had not concluded that the Soviets are going to break out.

What the Air Force asked for and the Chief did, is a study to determine what the Soviets' capability to break out is, because we have been very concerned about that.

We still are. The study said the nature of their system and the things they have done [deleted].

I have not seen the briefing itself. I only know by inquiry of the conclusion. [Deleted.]

Senator SYMMS. [Deleted.]

General HERRES. Again, I have not seen the briefing. [Deleted.]

Senator SYMMS. [Deleted.]

General HERRES. Yes, sir.

Senator SYMMS. Would theirs be that credible, or wouldn't you know?

General HERRES. It might be.

You see, the difference is that the Soviets have no reservations about using small nuclear warheads in their interceptor missiles.

Our policy has been not to do that. General Abrahamson's tasking is to build a system that does not use nuclear warheads in the interceptor missiles. That is a lot harder. You don't have to have as good a guidance system to do that.

That is why we have been so worried about the potential for breakout on the Soviet side, because their Moscow system uses nuclear warheads in the interceptors. Our concern is that they could build a mobile version of that system and the shortfall would be their radar capability.

But it looks now like they have the capability to build rapidly deployable radars, phased array radars, that can track well enough to get that interceptor in the basket, so that a nuclear warhead could destroy it.

So I suppose it is not inconceivable they could reach these kinds of kill probabilities.

Senator **Symms**. That leaves us in a fairly weak position, then, doesn't it?

General **Herres**. Well, if they do break out, I think we have a serious strategic problem. The deterrence posture and the balance changes if they break out.

My worst fear, as I described, is if they could break out [deleted] with a system that could achieve these kinds of kill capabilities, we would really change the balance.

Senator **Symms**. What would we do then? What then is the next step?

General **Herres**. Well, I guess it depends on what decisions we have made in the meantime, how far along we are with a system of our own, and where we stand with our own offensive capabilities.

Senator **Symms**. If they do break out and could deploy a system by the mid-1990s, then this makes a START agreement much less attractive, doesn't it?

General **Herres**. Well, without a defensive system, yes, sir. Exactly.

I mean, if they break out and we both are constrained by START, then we have a big problem without a defensive system of our own.

Senator **Symms**. My time is up.

Thank you very much, General, and thank you, General Abrahamson.

Senator **Exon**. Thank you, Senator.

Senator Levin.

Senator **Levin**. Is the requirement which you talked to us about today a classified requirement?

General **Herres**. Yes, sir.

Senator **Levin**. Is there any thought of declassifying it?

General **Herres**. We had not thought about it. But my instincts are if we declassified it, there would not be much left in it, I suppose.

Senator **Levin**. I know that General Abrahamson is going to be testifying that the believes the Phase I system will meet the requirement. That is going to be his testimony later today, I believe. Is that correct?

General **Abrahamson**. Yes, sir.

Senator **Levin**. I notice that that is unclassified.

General **Abrahamson**. Only that overall statement, sir.

Senator **Levin**. Yes. That particular statement is unclassified.

I am just wondering whether or not it adds a lot of credibility to have an unclassified statement that the Phase I system meets a requirement when the requirement cannot be discussed.

General **Herres**. Well, I guess we have a lot of classified requirements.

Senator **Levin**. Well, in this particular case, however, it is such a public issue. It seems to me, on SDI, I think you ought to at least give some thought as to whether you want to declassify it.

I am also not familiar with it until today, too. I agree with Senator Glenn on that. Perhaps it was brought to our attention, though.

Let me ask you a couple of questions on this.

The requirement is [deleted] as I understand it, General Herres?

General HERRES. Yes, sir. But the number in the threat bottle is defined. So it comes out to be a number.

Senator LEVIN. As I understand it, the DIA has testified that they could deploy [deleted] reentry vehicles, according to I think it is General Abrahamson's testimony, or your testimony. Your testimony is that DIA estimates the Soviets could expand their existing force to more than [deleted] reentry vehicles.

[Deleted.]

General HERRES. No, sir.

These figures apply against the threat model. I think you might have missed my comment earlier.

One of the big problems in developing this is to make sure that we have a threat model that would stand still, and we knew that we would be imposing just an unacceptable burden on General Abrahamson.

Senator LEVIN. What is the number in the threat model?

General HERRES. [Deleted.]

Senator LEVIN. So you are saying this must be able to——

General HERRES. [Deleted.]

Senator LEVIN. [Deleted.]

General HERRES. [Deleted.]

Senator GLENN. [Deleted.]

Senator LEVIN. [Deleted.]

General HERRES. [Deleted.]

Senator LEVIN. [Deleted.]

General HERRES. [Deleted.]

Senator LEVIN. [Deleted.]

General HERRES. [Deleted.]

Senator LEVIN. [Deleted.]

General HERRES. [Deleted.]

Senator LEVIN. [Deleted.]

General HERRES. [Deleted.]

Senator LEVIN. [Deleted.] Has that analysis been done?

General ABRAHAMSON. Sir, that is a very difficult analysis.

We are working on it because, prior to a national decision to go ahead, obviously that is one of the three criteria that has been imposed by the President.

Senator LEVIN. We don't have the answer to that yet, do we?

General ABRAHAMSON. We don't have a final answer to that yet because we don't have a final answer even on what the cost of these final systems might be. That is a product of the research program.

Senator LEVIN. When do you think we will have that estimate?

General ABRAHAMSON. I think we have preliminary estimates of the cost of our response to that Phase I deployment, and I talked about that last year. If you recall, I think it was something between at a minimum of 70 and a maximum of 140.

Now that is a very wide range. There is a reason why it is such a wide range, because we have not gone through a lot of the research program yet.

Senator LEVIN. Has the JCS looked at the conclusion of the SDIO that the Phase I deployment meets the requirement?

General HERRES. Well, the Phase I system concept definition is still open to a decision on its final configuration.

Senator LEVIN. I was reading from General Abrahamson's testimony and it says that we have examined the effectiveness of the Phase I SDS under a variety of stressing first strike scenarios and our analyses show that the DAB approved Phase I SDS is capable of meeting the JCS RV kill requirements under a wide range of conditions.

My question is did the JCS agree with that unclassified statement?

General HERRES. We have looked at what he can do and the practical problems associated with the approaches that are available, and we think it is an achievable goal. You know, we go through this acquisitioin process to determine whether or not you can really do these things.

I don't know if anybody has a crystal ball good enough to be sure at this stage of the game in any program.

Senator LEVIN. Well, I know that. But General Abrahamson has at least given us this estimate.

General HERRES. He thinks it is achievable.

Senator LEVIN. Yes.

My question is has the JCS decided whether or not it agrees with his conclusion that the Defense Acquisition Board Phase I SDS is capable of meeting the JCS RV kill requirements?

General HERRES. We have not looked at that specifically. We have not addressed that because the system concept definition still has some variables in it. It would be difficult, at best, to make a judgment, even when it is defined at this stage of the game, because we are not the technical analysts of this program. We don't have the technical staff that could look at whether or not all of these things are technically achievable.

We can make judgments, you know, some experienced judgments as to whether or not it seems like a practical thing to do, and using the approach that he would propose. But we really have not set it in concrete. The configuration of the Phase I system has not been set well enough in concrete for us to make that judgment. He still has some options open to him on what choices he would make, what the ingredient of the system would be, what would be terrestrial based versus space based and so on.

Senator LEVIN. My time is up. Thank you, Mr. Chairman.

Senator EXON. Thank you.

Senator Warner.

Senator WARNER. I am going to pass for now, Mr. Chairman.

Thank you.

Senator EXON. Senator Nunn, you would be next.

Senator NUNN. General Herres, I would like to follow up on Senator Symm's questions. I think it was Senator Symms who raised the question about the "Wall Street Journal" article.

Let me just ask you my question from the beginning.

First, have you read that article?

General HERRES. Yes, sir—well, I am not sure that we are thinking of the same one. Is it the one that referred to the Air Force study on Soviet breakout?

SOVIET BREAKOUT

Senator NUNN. Yes, the lead editorial in the "Wall Street Journal," that had the caption on it that the Soviets were prepared to break out.

General HERRES. Yes, sir.

Senator NUNN. What is your assessment of that?

General HERRES. Well, the article is erroneous because it says that the Air Force has concluded that the Soviets will break out and that they are in the process of doing that.

What the Air Force did is this. The Air Force Chief directed that a study be conducted to determine what the Soviets' capability to break out is, and if they should decide to break out, are they really poised to do it as quickly as our instincts have been telling us that they are.

The study, in effect, as I understand it—although I have not seen the briefing yet; I have asked for it, but I have not had it yet—as I understand it, [deleted].

Senator NUNN. Are there violations that have enabled them to do this, other than the Krasnoyarsk Radar?

General HERRES. Not that I know of.

Senator NUNN. So they are not in violation.

General HERRES. Not until they do it.

[Deleted.]

Senator NUNN. But that is not a violation.

General HERRES. There is nothing wrong with that.

Senator NUNN. So, it is not a violation.

General HERRES. Now, the one thing that was questionable, and is a violation in a different context, is the deployment of that radar to the electronics plant. I am sure you have heard about that thing.

I have forgotten what the name, the designation, of the radar is, but a radar which does have ABM capabilities and is not deployed to a site that is treaty compliant—a flat twin radar.

Senator NUNN. Are the JCS concerned about the Soviet breakout?

General HERRES. Yes, sir.

Senator NUNN. Are you predicting that they are going to break out?

General HERRES. No, sir.

Senator NUNN. You are not?

General HERRES. We are not predicting that they are going to break out.

What we are concerned about is their potential for breakout.

Senator NUNN. Well, hasn't the Department of Defense canceled the pen-aids program on the Minuteman missile?

General HERRES. Well, clearly, that is a compensatory measure against breakout.

Senator NUNN. Why did we cancel compensatory measures on breakout if you are that concerned about breakout?

General HERRES. I am not sure that I understand the question, Senator.

The idea, of course, is to be able to deal with breakout in case it takes place.

Senator NUNN. But the offensive program that would deal with that is being canceled.

General HERRES. Oh, I see. I misunderstood.

Sir, we did not really want to cancel it. If we did not cancel the pen-aids program, we would have had to cancel something else.

Senator NUNN. Well, then, the breakout threat must not be one of your top priorities and concerns.

General HERRES. Well, I don't want to say that it is not.

We are not forecasting that they will break out. As I said, I think if they were to break out, we would have to do those kinds of things. We would have to crank up that program and probably others to deal with it.

As I said to Senator Symms, we would have a real problem.

Senator NUNN. Can you tell us at this classification level, what the assessment is about the probability of a Soviet breakout by the intelligence community?

General HERRES. I could not because I just don't know what they would tell you.

I think you would probably get mixed views on that. [Deleted.] But I would hate to speak for them.

Our concern is for the potential.

Senator NUNN. We will ask them that question directly.

[Deleted.]

General HERRES. Yes, sir.

Senator NUNN. [Deleted.]

General HERRES. No, sir.

Senator NUNN. Is there a way to weigh that?

General HERRES. That is about what I was ready to say.

I am not sure. I mean, you can certainly analyze this in a thorough way. But in the end, you would have to make subjective comparisons [deleted].

Senator NUNN. Isn't it objective as to the projected degree of survivability, though, on both of those?

General HERRES. That is certainly objective, as are the numbers that we use here, objective.

But the translation of that into subjective elements such as deterrence, is what is hard.

Senator NUNN. Have you made an objective kind of analysis between Phase I of SDI and a full Midgetman deployment?

General HERRES. No, sir. Your common denominator again is deterrence.

Senator NUNN. Isn't the common denominator survivability?

General HERRES. No, sir, it is deterrence [deleted].

Senator NUNN. How are we going to be able to judge, let's say, a Midgetman deployed versus a Phase I SDI deployment? Let's assume that SDI costs $100 billion, whatever, and you come up in 2 years and say we want to deploy it, and in the meantime we have canceled the $40 billion Midgetman program because of the budget. [Deleted.]

General HERRES. I think you may find yourself, whether you like it or not, making some value judgments on that.

Senator NUNN. But you are making those value judgments. That is my point.

General HERRES. Well, we probably will have to do that, too.

But I would caution that to some degree it is an apples and oranges kind of situation. You may find yourself in the kinds of comparisons you get between different legs of the Triad and the constant debate that goes on about that.

[Deleted.]

A defensive capability can give you other things that a Small ICBM cannot give you. [Deleted.]

Senator NUNN. But you can do all of that with a lot less than Phase I.

General HERRES. Yes, sir.

I am just saying that the Phase I can do the task that we have laid out and those other things.

Senator NUNN. Well, if you come up with a $200 billion program or something like that, [deleted]. I mean, to me you have come off completely—which I agree with—the President's definition of replacing the deterrence. Clearly at this stage, the administration has projected the goal of having SDI replace deterrence.

Am I correct in that?

General HERRES. This Phase I system addresses, really complements, your offensive deterrence. There is no intent really to replace it.

Senator NUNN. It enhances the deterrence.

General HERRES. Yes, sir.

Senator NUNN. But, you see, that changes the ballgame.

The President has talked in the past about replacing the deterrence. He made a clear statement that SDI was not to enhance deterrence, but to replace deterrence. Now the program, I think correctly, is no longer on that definition. [Deleted.]

General HERRES. But this requirement is for Phase I.

Senator NUNN. I understand that. But we will all be dead before we get beyond Phase I.

I don't think Phase II is going to be under the jurisdiction of any of us.

Senator EXON. I am afraid, Senator Nunn, that you are worried about the umbrella, that it might not be quite hard enough.

Senator Warner.

Senator WARNER. Thank you, Mr. Chairman.

I would like to turn to Senator Nunn's question about the article in the "Journal," because it has stirred up a legitimate controversy here in the Senate in the context of the INF Treaty.

It may well be that a number of us will have to go down and engage in a floor debate on this, at which time I think the leadership of the Senate will determine what evidentiary material, over and above the comments by Senators, would be appropriate.

I have read and reread that and have discussed it with my colleagues, as well as with members and staff of the Armed Services Committee.

Let me lead you through one or two basic questions about it.

Having participated here with my good friend, the Chairman, for some 9 years now and watching each year the incremental changes in our strategic posture relative to the Soviet Union, we have observed the potential for breakout in terms of the programs they have in place and the likelihood that those pipelines could be accelerated very quickly.

We, of course, have been disturbed for some time about the Krasnoyarsk Radar. The President has made appropriate pronunciations about that in international fora, and he is quite accurate.

While we have not, at least for this year, had the opportunity to get the current strategic assessment, we are about to get that from CIA this week. Has there been any dramatic change in this posture that would give rise to this type of article, in your judgment?

General HERRES. No, sir. It is a situation that has been evolving and developing in a fairly normal way, in my view, over some period of time.

Senator WARNER. When you say it is a situation that has been evolving, a reader of the record might say that yes, they are moving toward breakout and it has been an evolving situation.

Now, "breakout" is a subjective decision by the Politburo, whoever it may be, the General Secretary. That could happen at any point in time, using whatever assets they might have at that time to effect a breakout.

What we must watch are the productions, to the extent we can monitor those, and certain elements which would provide the essentials for a networking to give it an ABM system. The radars are one component; the missiles themselves are another; then there are a lot of land-lines that have to be put in, presumably, a communications infrastructure.

While we have watched the Soviets stay within the ABM Treaty, in terms of their own defensive systems now, [deleted].

My question is do you know of any dramatic change in the facts that we know here in the United States which would lead us to think that the option is now more of a reality?

General HERRES. In the sense that you have just described it, [deleted] no sir.

In the sense that they have a defensive force structure from which it is relatively easy to break out, much easier than, for example, the kinds of technologies that General Abrahamson is pursuing, from that standpoint yes, sir, [deleted].

I think if they could, literally, roll them out tomorrow, I think we would see evidence of that. I think we would see substantial evidence, and that concrete evidence that you are talking about would have become evident or apparent to us. But we don't see that. [Deleted.]

The situation I was referring to is a situation under which they have a structured system that is relatively easy to rapidly expand and deploy.

[Deleted.]

The big thing is that their approach to this problem is the use of nuclear warheads in their interceptors, which makes the problem so much easier for them.

You don't have to have the same kinds of accuracies, tracking accuracies and so forth. And they have had this ABM system around Moscow. So, by using the same kind of missile, for which a tactical variant is not a big problem for them, they could test and develop all of the components and all of the ingredients under the umbrella of the treaty compliance system.

Senator WARNER. Yes, and they have been doing that.

General HERRES. [Deleted.]

Senator **Warner**. A note has just been passed to me by one of our staff which asks is this not a "creep out" rather than a "breakout?"

I don't know if that is a new phrase around here or not. But it is nearer to the truth.

General **Herres**. A walk-out, a creep out.

Senator **Warner**. So, they have within the ABM system the components that would be utilized nationwide in an ABM system.

General **Herres**. If they do break out, that is the way we would expect them to do it.

Senator **Warner**. But that would require gearing up many production lines, and development of a nationwide ABM communications system, a communications system which, presumably, has not been fully tested to date. Do we know that?

General **Herres**. [Deleted.] They would have to add something, I'm sure.

Senator **Warner**. The three basic components are radars, interdicting missiles, and the communications. They have all three components now within the ABM treaty.

What you are saying is, based on that curve of experience, they could start up production lines. We have no evidence that they have done that, or that they have gone to a network nationwide system?

General **Herres**. That is our concern and expectation, that they could.

Senator **Warner**. There has been no dramatic change in the evidentiary material that we have had over these many years that would give rise to the conclusion that is represented in that article?

General **Herres**. Yes, sir.

Senator **Warner**. Thank you.

I thank the Chair.

Senator **Exon**. I thank you, Senator.

I have one last question, and then we will hear from General Abrahamson. I think this is just another way of asking the question that has already been posed in various fashions.

[Deleted.]

Is this likely to be representative of the Soviet ICBM technology then?

General **Herres**. No, sir. We dealt with that.

[Deleted.]

Senator **Exon**. [Deleted.]

General **Herres**. Yes, sir.

Senator **Exon**. This system, if it were an all-out go, is this the system that would be deployed, the Phase I system—when?

General **Herres**. Well, I will let General Abrahamson address that.

General **Abrahamson**. Obviously it is a function of how much money and our progress. But our projection now is if a national decision—and that, I think, is what Senator Glenn was talking about—if a national decision were made some time in the 1993-1994 timeframe, it would probably require an additional 3 years of final development to get ready for just the initial part of a deployment.

This would depend obviously on how well you built the research base, which would allow you, then, not only to make a decision on what is technically feasible, but also on this important question that Senator Levin raised, what is the cost effectiveness.

Therefore, an important part of the research has to deal with that question. Those kinds of things allow you to make an accelerated development and final qualification program.

So I think we are talking generally about somewhere around 1996 or 1997, in that kind of timeframe—if the national decision were made in the 1993-1994 timeframe.

Senator Exon. If the national decision were made in the 1988 or 1989 timeframe, how much would it speed it up?

General Abrahamson. Well, we are a lot lower on the curve.

I would like to show you an example of the process here.

[Slide deleted.]

I now have the program broken into the major issues associated with each of the technologies and what we are doing in the research program.

If you look here [indicating], this is the space-based interceptor, and in the space-based interceptor there are probably about four major issues that say can that really be done and really be done right?

One of those important questions is can that interceptor a long way out look out against a difficult earth? What you see against the earth are all kinds of infrared signals. The question is can the interceptor pick out a small, cold body and destroy it.

Here is where we are now. You asked the question: if we were to reach a national decision in 1988? We think from all of the work that we have done already that we are about at a medium level of confidence.

By the way, this is a chart created by the technologists and not us.

However, what I have projected, when I say things like 1993 or 1994, is that there is enough controversy about this overall program that I really don't expect that the Nation would be willing to go ahead unless they get a lot of evidence out here that you can, indeed, make that decision, and for this one issue here [indicating] there are a series of other kinds of tests, some of them finally being fairly full-up. That would allow you out here [indicating] to make that decision.

Now, to specifically answer your question, if this were not just one issue but were the overall issue, the overall Phase I program is somewhere in this medium confidence level [indicating].

We would still, even if this decision were made to go ahead, have to go through a series of those steps. Hopefully, we would be able to have the resources so that you could condense it somewhat; but you could not condense it, you know, and just shove it right down into 2 or 3 years.

You just could not do that.

Senator Exon. I guess what you are saying, General, is that we have to have more information than we have right now——

General Abrahamson. Yes.

Senator Exon [continuing]. To make a decision as to when this system would be deployable. But you are basically saying that your best judgment, your guesstimate, is that it could not be deployed and in place before—if everything went fine, it could not be in place and deployed and deployed until what year?

General ABRAHAMSON. Well, what I have said consistently in the past is that I thought that if we had the kind of budgets that we had requested, we would be able to make that national decision sometime in the early 1990s. I tried very hard not to be too specific because, as you can see, there is a range.

Senator EXON. Yes.

General ABRAHAMSON. Then, what I meant by that, and I usually say this, is that you can make the decision at some higher risk level earlier, but probably in the 1991 to 1992 timeframe.

I believe, with what has happened to our budget, that that has slipped at least a year and a half, maybe 2 years.

Senator EXON. To the 1993-1994 period?

General ABRAHAMSON. To the 1993-1994 timeframe.

That is when you would make that decision on a high quality basis.

Senator EXON. That is what I wanted to know. I was not trying to trap you or anything.

General ABRAHAMSON. I realize that, sir. The reason that I say it that way is there was what I considered in the past to be this whole question of early deployed, and people confused phased deployment with early deployment.

Senator EXON. General Abrahamson, we would be happy to hear your presentation now.

STATEMENT OF LT. GEN. JAMES A. ABRAHAMSON, DIRECTOR, STRATEGIC DEFENSE INITIATIVE ORGANIZATION

General ABRAHAMSON. Like General Herres, I have a statement that I would like to offer for the record, sir.

Senator EXON. It will be accepted in total, without objection.

General ABRAHAMSON. Because of the character of some of the questions, even though I know you understand our system very well, Mr. Chairman, I would like to use the occasion just to summarize a little bit of what I think to be the basics.

Senator EXON. Please do so.

General ABRAHAMSON. If you would be willing to accept that, I would appreciate it.

I am primarily keying in on a question that Senator Glenn asked and his concern with are we suddenly surprising everybody?

As we started in this research program, we did not have requirements, we did not have clear threats. What we had was some technical roadmaps that came out of the Fletcher Commission. Those technical roadmaps showed various options, ways in which you could develop sensors and/or weapons which might be effective against the Soviet force in the future.

Obviously that was where you start when you are doing something as dramatically different as trying to put together a ballistic missile defense where the Nation had not even thought about a ballistic missile defense in the future.

As we went into the program and as we proceeded with that, clearly we picked out the most effective pathways and the ones we were making the most progress in, and we used that as a guide to allocate our expenditures. But we always tried to maintain a balance between some of the more mature technologies with the risk of achieving some kind of effective system and some of the more exotic technologies that, in the long run, may offer some very, very different capabilities, but where the risk was much greater.

But we always tried to maintain a balance between those. By the way, that was recommended out of the Fletcher Commission and in nearly all of my testimony each year there would be some question about what is the balance and why are you allocating the money in that way.

In 1985, it became very clear to me that the debate was all about the final system and what that might look like and how and when that might be deployed, and whether or not it would be perfectly effective.

I became distressed that the issue is not only what that final system might look like; the issue is how one gets there. Therefore, I began to include in my briefings—and those were both private briefings to individual Senators, certainly to staff members, but also in several of the various committee hearings—I included two key charts. One of them was a notional chart that talked about phased deployment and what that might mean. It had no time scale on it. But what it indicated is that the logical way to proceed with anything as complex as this, anything as difficult or different as this, is to do it a step at a time. By that I mean to be able to proceed through the development process, learn those lessons, as well as proceed into the deployment process a little at a time and learn from that, to insure that when the later on phases begin to come in, that you learn those lessons, that you have learned what kind of operation that implies, and that you have learned and watched the Soviets to see how they might react.

So, I used this phased deployment chart without any timespan. But I used that starting in 1985 and in 1986 and in 1987.

What I am, unfortunately, able to say is that I don't remember specifically if I included this when Senator Glenn and others were here at the time. But I do know that I included that in many of our open hearings. It is an unclassified chart.

I had a companion piece with that, and that was because I wanted people to think about what is this research really leading to. It is leading to the ability of the Nation, whoever it might be, the administration at that time and the Congress to make a meaningful decision, something that they had confidence in, that they truly understood. And so, this chart laid out and I said if there is a Phase I, an initial deployment, whenever that might be, that you probably need to know the details of that, the architecture, what threats it would be effective against, how much it would cost—all of those things, very, very carefully and in a very detailed way.

At the same time, you would want to have confidence that you know enough about some of the immature technologies that are coming on later on so that you have some confidence that those paths are not going to be dead ends; but if you waited until the last question was answered, you would never get there because there is never a last question.

Therefore, the chart specifically indicated that you needed to make the first decision with high confidence, but you needed to have the ability to have some reasonable confidence for follow-on systems.

Now, the debate in those days was what I thought was the debate of the extreme, about what could you finally do, as opposed to reality, and that is what you can do in a timeframe, what the Soviets might do in response.

People asked legitimate questions, many by very responsible critics. But they would always have the "threat of the month" kind of thing, a kind of "dial a threat" process that we had to deal with.

So, what I needed was some structure in order to be able to operate. That was, we had the President's long-term goal, and nobody was abandoning that as the long-term objective; but we needed some judgments by the community of what is a meaningful first step, not just a political step, but what is a meaningful step from a military point of view, and how would that, working with our other forces, truly find a way to enhance our total security even when that first partial deployment occurred?

Therefore, we all eagerly entered into the Defense Acquisition Board process last spring. That Acquisition Board process really did several important things. You have heard General Herres' testimony.

It caused the Joint Chiefs, the people with the most military experience, to consider very carefully, what is this meaningful first step.

By the way, I think you heard very eloquently what went into that, how difficult that is, and that gave me something to shoot for in the architecture.

By the way, that is important, not merely because eventually it will define what a deployment might look like; it also helps me channel the research and focus that research.

But it was not only the requirement that was a valuable output of this Defense Acquisition Board process. The next thing was the threat, because, obviously, again, people would sometimes ask and deal with countermeasures or propose things without having any idea of the things that the Soviets might do, and those were limited really only by the imagination of the critics, as opposed to a careful, considered judgment about what the Soviets could really do in a certain timeframe, what was likely for them to be able to do.

Therefore, a second, very critical, output of the Defense Acquisition Board process was what is called a "STAR," or a threat document.

That threat document I could perhaps best summarize in this way.

[Slide deleted.]

You heard General Herres outline the offensive threat, the number of missiles that might face us.

I also had to think through and say what are realistic and reasonable Soviet responses and in this case, it goes beyond what the intelligence community can, with any certainty, predict.

So, this is a mixture of judgments about what intelligence tells us in the near-term and what are practical and reasonable assessments by technologists in the longer term.

This potential response [indicating] of what the Soviets might be able to do then was documented in this initial threat document, which actually occurred in its final form, after the DAB. It was published in September. So that, again, gave me a very important peg point in order to work against.

Finally, the DAB process allowed me the opportunity to test several different architectural concepts against those requirements and those threats to see if they could meet the particular requirement laid out in the face of things that the Soviets might do. And that is an important test.

By the way, that test was examined not just by my office, obviously. It was examined carefully by the acquisition community, as a whole, and some judgments were made. And, by the way, there were some holes in that process.

There were some clear things that, when I came to the DAB, I said here are some questions that are still unanswered, or I don't have high confidence in.

I refused, at that point, to be rushed into trying to define that answer and just deal with it because there were important unknowns that were left.

Therefore, the result of that decision was an approval of an architectural baseline by the community, a baseline that, through many analyses, showed us that, in general, it varies with different scenarios, but, in general, we have a way to meet the requirement.

I can give you some numerical examples of what those things might look like just for reference.

But what you must do is go into each of the countermeasures and go into each of the scenarios in order to talk about the effectiveness.

This is at the Secret level now, and for the record here, this is one of those analyses. By the way, it was not just a few of these analyses that were run. They were run by our architects; they were run by the staff of the JCS; they were run by many different groups; each run providing some insight, but not final assurance, as General Herres indicated, that yes, you can finally meet this because, of course, there are many assumptions in those.

Now, if we assume that with the architecture that we laid out—and, by the way, maybe it is worthwhile for me to spend a minute on what that architecture will look like.

[Slide deleted.]

The architecture was structured to be robust and to include two rather critical layers, one being a layer that could deal with the boost and the post boost element because that added the greatest degree of uncertainty and, in our judgment, provided a robust capability, a threat that the Soviets never had dealt with before, and then some mid-course capability.

Notice that it did not include terminal defenses. [Deleted.] I have tried to give equal weight to that part of the program, even though it was not included.

It had to deal with a set of eyes—and this is specifically the [deleted].

That missile force that is coming up would be struck with, initially, things that are not such a huge risk for us, things that we know how to build quite well, and those are missiles. Those missiles would be placed in carrier vehicles, and so, the specific architecture was around [deleted] or so of those missiles in orbit at about 500 kilometers—a little over 200 miles—out in space.

Now, that has certain characteristics to offer. But it does not provide all of the uncertainty, and it does not provide enough of a problem for the Soviet planner and, therefore, we included ground based interceptors, the ERIS missile, that would reach quite far out into the mid-course. Those are specific developments that we are researching and looking at as we go through. We also had to deal with decoys, how do you see those, and one of the unknowns that I presented to the DAB was "what is the best way to tell the difference between decoys and RVs?"

I was just not ready to say that I know that answer and that I know it with confidence.

As I said, I refused to go ahead in the DAB and say just assume the answer and assume that we could get there.

I thought that was being too optimistic. It was not credible.

By the way, we laid out an architecture that was based on 1,000 of these systems, and then some unknown combination of space or ground elements for the mid-course sensor problem, the way that you tell the difference between decoys and warheads.

Now, in terms of the performance of some of those, as I said, it depends on how effective some of the countermeasures are. Obviously, all of these are assumptions. So you can get a feel for the judgment that I am making behind the fact that I think that architecture responds in general to the requirement.

In the case where there are no counter-measures at all of any kind--and, by the way, there are not serious countermeasures that we are aware of, except in very few ASATs at this point in time—such a system, if it were carried out in accordance with some of the reasonable assumptions that we thought, might be able to destroy up to [deleted] percent of that initial first strike, some [deleted] warheads, as a total.

However, when you add decoys, obviously there are going to be some misses. Some of those interceptors, either based in space or based on the ground, are going to get the wrong signal, and some of them are going to hit a decoy rather than the other, because we don't have perfect certainty in all of those areas. So, it goes down, and you begin to go down with a certain particular set.

This is why General Herres indicated that it is so scenario-dependent. It would go down to approximately some [deleted] percent and be reasonably effective.

Then we said well, what if they did something so dramatic that they even could elude our entire boost-phase capability and we could only then be active in the post-boost, and mid-course, the architecture, again, when tested against that initial [deleted] RV attack, was about [deleted] percent effective?

Then you have to roll in some of the other things that the Soviets could do to destroy some of your system, and then those numbers go down, et cetera.

So, there are many, many runs of this kind that lay out and tell us that if our assumptions about where we can go in the technology are reasonable, then we can go ahead.

Now, if I could put that in the context of our acquisition process——

Senator **Wilson**. Mr. Chairman, excuse me.

General **Abrahamson**. I am sorry to be quite so long.

Senator **Exon**. Senator Wilson.

Senator **Wilson**. I hate to interrupt, but on the other hand, I am compelled to.

General, will this take very much longer?

General **Abrahamson**. I will finish very quickly, Senator.

Senator **Wilson**. I have some questions that I would like to ask and I am afraid that I am compelled to leave very shortly

General **Abrahamson**. Well, then, let me be very short at this point.

It is probably unfortunate on our part that we have picked some of these particular numbers and names because I know that that is confusing.

In the acquisition process, Milestone I is well in the research phase. It is not a plan to deploy nor is it an approval to go even into development, and, therefore, we have never considered and I have never considered that that represents the national decision to go into development.

I believe that in other weapon systems, in fact, the demonstration and validation phase still has the function of providing the confidence so that, when you go into development, you have the ability to be able to produce or to project with some certainty that that development will be successful, and, in addition to that, it will be able to produce a weapon system at a certain cost level.

All of those are very important parts of it.

So, Milestone I represents an important bureaucratic milestone within the Department of Defense. But it is not going beyond the research phase of the program, nor is it any kind of national decision to go ahead. That is really a Milestone II.

The Joint Chiefs, recognizing the theory that I talked about here, that you want to have some confidence that you can go into the second stage, put essentially a requirement on us and asked that for some of the follow-on systems, the Phase II, whatever might follow this, that you should at least have gone through this Milestone I prior to the time that you go through a Milestone II for the next phase.

That puts a bureaucratic limit on us that defines this confidence level between the two.

Then we all recognize that, in fact, there would be changes as we go ahead.

When I went before the members of the Defense Acquisition Board, I felt that, in order to properly keep this within the acquisition system, there should be an annual review where updates and changes can be examined and looked at, and blessed, and we can say "do they make sense?"

So we are now in a process so that each year there will be a DAB again, to look at where we are going, what progress we have made, and we can report on that, and, in fact, then the defense acquisition process can find a way to give us a new judgment.

Now, we did come over and present to the staffs—Dr. Smith came in September and presented the results of that DAB process, and

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did include the specific classified JCS requirements as well as the DIA threat, as we understood it at that point in time.

Unfortunately, that information and those various briefings and discussions may not have gotten as wide a distribution of that information base out to everybody. In that sense, I am sure we are remiss.

But we really did try to report as well and as effectively as we could at that point. Obviously, it is always hard to get across to everybody what the process is.

With that, I will stop and would be happy to answer your questions.

[The prepared statement of General Abrahamson follows:]

PREPARED STATEMENT BY LT. GEN. JAMES A. ABRAHAMSON, DIRECTOR, STRATEGIC DEFENSE INITIATIVE ORGANIZATION

Mr. Chairman, thank you for the opportunity to appear before you today with General Herres of the JCS to discuss JCS requirements for Phase I and the effectiveness of Phase I at meeting these requirements. I understand this will not be a hearing to discuss the overall SDI Program which I traditionally present at our first meeting. I will, however, be presenting that testimony on March 21, 1988.

As a key part of the Defense Acquisition Board (DAB) process last summer, with specific emphasis on a review of a Phase One Strategic Defense System (SDS), the Joint Chiefs of Staff (JCS) formally identified ballistic missile defense operational requirements with the development and approval of a Joint Mission Needs Statement, followed by a statement of requirements for a first phase system. The JCS recognized that these initial requirements, if achieved, represented the first step toward the President's goal of "eliminating the threat posed by strategic nuclear missiles." Additionally, they provided the Strategic Defense Initiative Organization (SDIO) an operational benchmark, essential in our process to determine "the feasibility of deploying a thoroughly reliable defense against nuclear ballistic missiles for the United States and our allies."

We have long realized that it will take time and significant effort to develop and deploy a defense capable or meeting the President's goal. This realization led to the development of a phase deployment concept, intended to employ maturing technologies appropriate to achieving the defense mission objectives. Each phase will provide increasingly effective and meaningful defensive capability along the way to achieving this goal.

The important point to be made here is that the Strategic Defense Initiative (SDI) Program, the DAB process, and the phased deployment concept are not separate; they are, in fact, one and the same. These three are integrated into a strategic approach whose singular goal is to move toward achieving the President's goal of eliminating the threat posed by ballistic missiles. The Phase I SDS ability to meet JCS requirements is the first operationally significant step along the path to that goal.

JCS REQUIREMENTS

[Deleted.]

The SDIO then used these requirements to identify the most effective, balanced architecture that would meet JCS Phase I operational goals and permit evolutionary growth capability. We have examined the effectiveness of the Phase I SDS under a variety of stressing first strike scenarios and our analyses show that the DAB-approved Phase I SDS is capable of meeting the JCS RV kill requirements under a wide range of conditions.

[Deleted.]

CONCLUSIONS

The DAB review resulted in the following important judgments. First, the phased approach to development of a total Strategic Defense System (SDS) is a logical basis for structuring the SDI Program. The phased deployment concept considers five key factors: (1) operational requirements, (2) time, (3) technology, (4) defensive missions, and (5) responsive threats.

It recognizes that some efforts and technologies will mature faster than others and that deployment of defense must take place over time. As the defense elements are deployed, they can effectively perform defensive missions against a wide range of anticipated threats. This approach expects that, as other technologies mature and are deployed, they will improve the capability of the existing system and provide additional capability to perform new and more demanding missions. Finally, a phased approach also frustrates Soviet attempts to evade, deceive, or defeat our defensive systems.

Second, the DAB review stated that the Phase I SDS should proceed as an integrated whole rather than as separate elements. This assessment was based on the ability of the space- and ground-based layers to work on concrete to create uncertainty for and complicate the ability of the Soviets to destroy specific targets.

And third, the DAB review stated that concept definition and technology development for the follow-on phases should continue.

Again, let me emphasize that the SDI program, the DAB process, and the phased deployment concept are not separated from each other. The JCS efforts to identify Phase One operational requirements represent a significant step in that process, enabling the SDIO to define and evaluate an architecture that responds to operational needs. This allows us to design an integrated approach whose purpose is to move toward achieving the President's goal of eliminating the threat of ballistic missiles.

Last Spring's DAB review provided an essential validation of our technology plans and our concept. Even more important to the day-to-day guidance of the research program, the JCS requirement outlined a meaningful military contribution of defenses to our total deterrent posture. Further, the threat documents that have been approved as part of the ongoing DAB process allow us to measure our architecture and our technology research against threats that are meaningful rather than a "dial-a-threat" approach which is often used in the public debate where the threats are limited only by the imagination of the critic as opposed to what can be realistically implemented by the Soviets.

The DAB review is an ongoing process. The SDI program will be subject to annual DAB reviews so that our advancing technology and ideas can be tested by the Department of Defense acquisition system. I supported that initial review and I urged that it become an annual review because I believe in the validation of this process. Since that review, we have completed a major study of the best approach to discrimination of potential decoys from actual warheads. That study was different than earlier studies because one of the important products of our research has been the development of additional analyses of nuclear effects and this was a major input to the entire study. Out of that study and our ongoing research have come some additional decisions. One of the potential decisions is to propose the addition of ground-based radar to our array of midcourse sensors. The second is that we have been able to simplify and reduce the requirements for space-based and ground-based optical sensor systems. When fully implemented, both of these decisions will ensure that a future strategic defense system will be less costly and more effective against a wider array of Soviet countermeasures. An additional recent activity is our examination of a ground-based, Treaty complaint deployment. This may be an effective way to initiate a future phased approach to stragetic defense. My office is constructively engaged in that examination and finds that our technology can contribute to such a deployment should it be judged to be the proper first step from a policy and treaty viewpoint. This is an aggressive examination by my people. They made an initial presentation to the Secretary of Defense. There is additional work to be done. In all cases the DAB review and the additional definition of goals which allow a phased approach to the President's final objective is an indication of the overall dramatic progress that the SDI program has been achieving through its research and continuing review which are underway at the Department of Defense.

Senator EXON. General, thank you very much.

In the interest of saving time and since Senator Wilson has to leave, we will begin with questioning from Senator Wilson.

Senator WILSON. Thank you very much, Mr. Chairman.

I appreciate your courtesy and hope the General will forgive me for what may appear to be discourtesy. I am simply compelled to operate under some time pressures today.

Let me say, for the record, that the briefing to which you have just alluded, is one that I received, and I assumed that others did, too.

This takes me to my first point, Mr. Chairman.

I apologize for being unable to be here earlier. I understand that at some point this afternoon, one of the members of our subcommittee expressed some surprise that, in fact, the purpose of the meeting was to present a validated military requirement. I think that just proves that we are all busy people and that things can escape our notice, even important things.

For the record, and the record will reflect what I vividly recall, our colleague from Michigan, Senator Levin, some 2 years ago, I think, interrupted a presentation with a very pertinent question, and that was has there been a finding of a valid military requirement for this program.

He, I think quite properly, belabored the issue and the people making the presentation then gave the answer of no.

He pressed the point, and I agreed with him then. I agreed that there was need for such a finding.

General Herres will recall that I think somewhat over a year ago I belabored him at great length as to when that finding was going to be forthcoming, and he, with infinite patience, sought to instruct me in the necessity of proceeding deliberately. So I curbed my impatience as best I could.

Today we have the presentation.

So, it should not be a surprise to anyone.

We are all busy. I learn things sometimes that surprise me. I did just the other day.

Let me ask this question of General Herres. Again, not having been here earlier, I may have lost the thread. If the Joint Chiefs had not been convinced, had not believed that Phase I, as described here this afternoon, would meet this validated military requirement, then why would they have allowed the SDI program to go past Milestone I?

General HERRES. Well, the Milestone I implementers is still not out. The implementer that covers the broad program, which, in effect, sort of defines the Milestone Zero marching orders, concept exploration, and so forth, all of that has been laid out.

The system concept definition for Milestone I is still not firmly in concrete yet. We really need that for Milestone I.

Jim has described the end of the system about which there is still some flexibility—how much of a mix there would be in the terrestrial based system.

But, to get back to your question—I just wanted to clear that point up—the DAB would make the determination on the Milestone I tasker, and it would be a determination that the system defined to meet the requirement.

I think it is fairly clear to us that General Abrahamson can build a system that would meet the requirement. Now, when he can do it and how much it would cost and what kind of problems there would be, technical problems along the way, he knows the answer to those questions much better than we do. We put the benchmark out there and set up the goal posts for him.

The Chiefs believe that the requirement is achievable, and they believe that it is a valid and necessary and useful contribution to deterrence, defined in those terms.

That really does not answer your question directly, Senator, but I am not sure that I know how to answer it better than to explain that relationship. It is the DAB, the Defense Acquisition Board, which makes the decision that, in fact, he can do this and that the requirement, that what he's got is something that is relevant to the requirement by way of system definition.

Now, as General Abrahamson said, what lies ahead is continuation of the process to validate whether or not the system that he is defining—it's very close to being fully defined—whether or not that can, in fact, do the job. That determination then would come at the full-scale development point, Milestone II.

That really is the big decision because that is when you start talking about spending a lot of money.

ARRIVING AT MILESTONE II

Senator WILSON. And answer my question, too, if you would, as to when we will get to Milestone II.

General HERRES. Well, when he has conducted enough experiments and demonstrations that validate that the concept he has defined to meet that requirement can, in fact, do the job and he has demonstrated that with sufficient confidence that the Defense Acquisition Board feels that we should move ahead to full-scale development, that would be and I will let him answer how far away that is. We were thinking in terms of 1992 to 1994, depending on the funding situation a while back, but the funding situation has changed. So I would have to defer to General Abrahamson.

General ABRAHAMSON. I think as I indicated, in the past I have always felt that that would be somewhere in the early 1990s, and somewhere around the latter half, if we received anywhere near the funding that we were after, and if the technical progress went on as we have said, that that would be somewhere in the early 1990s. I thought that that meant like 1992.

I believe with the cuts that we have now received, not only in fiscal year 1988 and earlier years, but in the projected out-years in that timeframe, that we are probably talking in 1993–1994, somewhere in that timeframe.

Senator WILSON. Mr. Chairman, I wonder if I might ask your further indulgence to let me ask one more question before I have to go.

Senator EXON. All right, Senator Wilson.

Senator WILSON. Thank you, sir.

Let me come to focus on a point that evidently has come up this afternoon.

We are in a time of very constrained defense expenditures, with many competing claims on the dollar. As I read what you have presented this afternoon, it is consistent with everything that we have expected in the way of goals. When you spoke of this validated military requirement, you spoke of enhancing deterrence and limiting damage from strategic ballistic missile attack.

The question has been raised this afternoon, I gather, as to two competing systems: Midgetman and SDI.

MIDGETMAN

Can you tell me how in the world Midgetman, 500 single warheads, can limit damage to critical C^3 nodes, targets that are essential to our functioning?

It is possible—well, I will just let you start there.

General HERRES. [Deleted.]

Senator WILSON. Well, considering that, presumably we would be letting go of the Midgetman, if we had a fleet of 500 in response to an attack upon them, I don't know how many would survive that attack. But it is likely that whatever number survived, speaking of being scenario-dependent, that those would pose a very significant threat to the penetrability of a Soviet attack on command and control centers?

General HERRES. No, sir.

[Deleted.]

As I pointed out, clearly a defensive system could do things that the offensive threat cannot do.

Senator WILSON. That is pretty fundamental, though.

General HERRES. Yes, sir.

Obviously, in our view, they are complementary. The two systems have to be complementary—the offensive system, whatever it is.

Senator WILSON. I would agree with that. But if you take that point, if you think you have to have both a sword and a shield, if you have only a sword, or a sword and a dagger and no shield, then you are in a very different situation, are you not?

I don't want to get too metaphorical, but I think you made the point that there are certain things which a defensive capability can do that, absent that capability, you cannot expect.

General HERRES. Yes, sir. You are absolutely right.

What I think would make good sense—the strategy will evolve. There are a lot of variables in the evolution of that—what happens to strategic arms control, how the national judgment on this system comes out, as well as the deployment of a modernized ICBM force. All of those are variables.

But what makes good sense and what we have striven for all along throughout this whole area of nuclear strategy is balance. We have tried to balance the legs of the Triad. We have tried to balance our capabilities so that the systems can complement one another, so that the strengths of one can complement and substitute for the weaknesses of others. Now, a strategic defense opportunity lies ahead that can add further balance to what we do.

Senator WILSON. In that connection, have the Joint Chiefs consulted with General Abrahamson, and have they been themselves consulted by the administration in terms of what the impact of the proposed START agreement might be with respect to that balance that you have just sought to define?

General HERRES. Well, probably not in as precise a format and context as your question would imply. But we have given a lot of thought to the impact of an agreement on all of these variables. There are enough variables.

Senator WILSON. Have you shared——

Senator EXON. Senator Wilson, I am going to have to say that your time is up. There have been Senators sitting here since 2 o'clock who are waiting to ask questions. I allowed for you to have one more question after your time was up.

Senator WILSON. Yes, Mr. Chairman. Thank you, but I thought they had all already been through their rounds.

Senator EXON. Oh, no. We have not had our rounds yet. You were the first one that I recognized.

Senator WILSON. Oh, I beg your pardon. I do thank you for your courtesy. I had no idea. I was late and had thought everyone had preceded me.

Senator EXON. No. We had let you go first because you had a time constraint.

Senator WILSON. And I thank you very much for your courtesy.

Senator EXON. Please, extend the question, but then I would like to move on and recognize other Senators.

Senator WILSON. I'm sorry, Mr. Chairman. I had misunderstood and I thank you very much for your courtesy.

General HERRES. I think I had left off trying to stress the balance and, as we look ahead through the variables that still lie within the different ways that a START agreement might come out, there is a wide enough range in how it might come out. It is hard to say what the impact of all of this might be, for example, a Phase I deployment would be on a START constrained strategic force structure, a Soviet strategic force structure, and what would be the best complement to it on our side. I think that is kind of hard to say at this point.

There are a lot of ideas around, and you can make some pretty good calculated guesses. But we really have not done the kind of analysis that your question would imply.

Senator WILSON. Mr. Chairman, let me again thank you and conclude by making the observation to you that if they have not, and if the administration is currently negotiating a START agreement, if that thinking has not been shared with the administration, it seems to me that it should be, and I think perhaps we might use your good offices to make that suggestion quite pointedly.

It seems to me that it is relevant as hell.

General HERRES. Yes, sir. We certainly recognize that.

Senator EXON. I will hold my questions, General Abrahamson, and will recognize Senator Nunn now.

DIFFERENCE BETWEEN MIDGETMAN AND SDI

Senator NUNN. Thank you, Mr. Chairman. Let me just follow up on Senator Wilson's question because he had a good question about the difference between Midgetman deployment and SDI.

There is no doubt about the difference in defensive and offensive terms.

What I was obviously getting at, General Herres, and I think you understood, is when you said [deleted].

Senator Wilson asked you about the C^3 and if the SDI would protect the C^3. Also, we have been trying to protect the C^3 and have poured a huge amount of money into redundancy of the three systems. I had thought we were striving over the last 6 years to have redundancy in the C^3 to the extent that we would have survivable C^3 and the administration's goal, which we have been told is to assure that there are no critical nodes, that we cannot have enough redundancy to continue to operate. Does that mean our C^3 expenditures have not reached that point?

General HERRES. No, sir.

I certainly would not want to say that. Of course, the world is always changing, and there are always new threats and new vulnerabilities.

Senator NUNN. But we keep putting in new money. That is what we keep trying to do.

Do we have a critical problem at this juncture with the C^3?

General HERRES. No, sir.

Senator NUNN. Or do we forecast any critical problem with C^3 in the next 3 or 4 years?

General HERRES. I always feel like we are on the hairy edge of the cliff.

Senator NUNN. It changes all the time.

General HERRES. But we are there. I do think that we have the ingredient of deterrence that is necessary today and we have to continue to work.

As you know, you all are funding programs that will continue to make improvements.

Senator NUNN. But defenses are not the only ways to continue to have a C^3 that is survivable, isn't that correct?

General HERRES. That's right. Yes, sir—just as you say with the small ICBM.

Senator NUNN. These are just different ways to have that.

General HERRES. Yes, to have that.

Senator NUNN. So you have to weigh them, is that correct?

General HERRES. Yes, sir.

Senator NUNN. I mean, if we were going to build a defensive system [deleted].

General HERRES. I think so.

Senator NUNN. And on the C^3, in protecting the C^3, you would have to weigh defenses and how much they would cost to protect the C^3 versus redundancy and other ways of protecting the C^3, would you not?

General HERRES. Yes, sir. [Deleted.]

Senator NUNN. Right. I agree with that.

Let me ask you this. The JCS requirement, [deleted].

General HERRES. [Deleted.]

[Deleted.]

Senator NUNN. The reason I am curious about the requirement is because in the MX rail mobile, not the Joint Chiefs but the Air Force has come up and testified that [deleted].

So I find myself curious as to why the JCS, in the defensive system, do not postulate the toughest scenario and the Air Force switches gears on their sales job on the rail mobile MX and they do not postulate the toughest scenario.

Each of you picked out the easier scenario.

General HERRES. Sir, they are looking at justification for a complete system. We are talking about a requirement for the first phase of SDI.

I got your message before, but that was when we address the second requirement.

Senator NUNN. I'll have to see for how long I am going to get elected before I even worry about that.

How many years do I have to stay here to consider the second requirement? What year is that going to be?

General HERRES. I should defer to the developer for the answer to that.

Senator NUNN. General, how many times do I have to go to the ballot box to make that decision on the second one?

General ABRAHAMSON. That is a hard judgment in the second one.

My guess—and it is a guess, Senator—is if we can get in the early 1990s to some kind of Milestone I in our normal acquisition process, and, again, that there is enough investment in that, that you could probably get to a Milestone II maybe 8 or 9 years after that.

I guess what I am saying by that—and this is a guess, and it is supported, by the way, by some fairly tough looks by other people outside of SDI, who have looked at the directed energy systems and said how fast they might come. The American Physical Society did that. They felt that we probably could see something after the turn of the century in a follow-on kind of system.

Senator NUNN. So that is within 12 years or something like that.

General ABRAHAMSON. If that follow-on is directed energy, I believe that you can see some of those. Some directed energy things might be a little earlier, some a little later. But you can begin to see directed energy things contribute to the overall problem I think somewhere in that timeframe.

Senator NUNN. General, I will ask you this followup and then I will yield.

Is that all right, Mr. Chairman?

Senator EXON. Certainly. Go right ahead.

Senator NUNN. [Deleted.]

General HERRES. [Deleted.]

Senator NUNN. Do you think generated is rational?

General HERRES. Excuse me?

Senator NUNN. Do you think a generated attack is rational?

General HERRES. I don't think any nuclear attack is rational.

Senator NUNN. I don't, either.

General HERRES. Under any circumstances.

Senator NUNN. I don't, either.

General HERRES. So I guess it is another way of saying—it is kind of a gratuitous argument.

Senator NUNN. For years we have been planning against irrationality, and then, all of a sudden somebody says one scenario is no longer rational. Well, hell, none of them are rational. I mean, a general attack, a nuclear attack is rational?

You said it is not, and I am not arguing with you.

General HERRES. But that is what deterrence is all about.

Senator NUNN. Surely—to make it irrational.

General HERRES. And we enhance that, and we make it much more unacceptable if we increase the probability that it cannot succeed.

Now, there are different ways to increase that probability. [Deleted.]

Senator NUNN. I just don't see how it is irrational for the Soviets to do it in one planning document and rational on the other.

General HERRES. We are kind of hung up on the words "rational" and "irrational." You know, all of it is irrational if deterrence is at a significant level.

Senator NUNN. [Deleted.] That is the point.

General HERRES. Well, I am not sure that I like the idea that they are writing it off.

I certainly would not want, and I would have had a difficult time in my previous job at Colorado Springs, at NORAD, telling the American people as they came through there to look at our facility and find out what we are doing, that we don't think that a [deleted] attack is rational enough to consider how to deal with it.

We are prepared to deal with it all the time. The question is how much should you invest in the possibility that that might happen.

Senator NUNN. Well, that is what we are talking about on defensive.

General HERRES. [Deleted.]

Senator NUNN. I agree with you.

General HERRES. [Deleted.]

Senator NUNN. I agree. But we are talking about a powerful lot of money on the defensive system to guard against that same kind of attack.

General HERRES. Our job is to make it irrational. That really is what it is all about. We have to find ways to continue ways to make it irrational.

Senator NUNN. I agree—with offense and defense, or some combination thereof.

General HERRES. [Deleted.]

Senator NUNN. Thank you, Mr. Chairman. I have overrun my time limit.

Senator EXON. Yours was a good line of questioning, Senator Nunn.

General ABRAHAMSON. Mr. Chairman, may I add a comment, please, because I think it may have some value.

Senator EXON. Surely. Go ahead.

General ABRAHAMSON. Without discussing the issue of the requirement or the rationality of it, I would, if I may, comment briefly on what it might mean to the technical problem of dealing with each of those attacks.

I think that the concern in the [deleted]. Therefore, by stating that and by stating that we have to have a man in the loop as part of the process, a human part of the process, to which I think I have testified over the years I think is important.

I think that is the stressing element.

How or when the decision is made, once the decision is made, then it is the structure of the attack. By the way, I don't know if a [deleted] attack would have a different structure. But they affect different ways that you may be able to respond.

I think the responsibility of the defense system is to be able to respond to the structure of the attack and, hopefully, to be able to respond within the time line of the worst case, which is a [deleted].

But that structure of the attack may be determined, may be in their war plans today. It may be generated or it may not be. But our problem is to deal with whatever is that structure.

So, in that sense, the underlying assumption is that the generated attack may be more difficult. I think it is more difficult from a time line viewpoint.

I don't know the full variation and how they can structure the attack. But we do do certain things.

For example, where I have run analyses of how this kind of system might respond to the [deleted] RV attack, which assumes that you would have follow-ons, we test that and we see how fragile the architecture might be by also running against a much larger attack or a much smaller attack, and to see then is that fragile and what happens or not.

Senator NUNN. I am not criticizing your scenario and I am not criticizing [deleted] at all. I think you have to be prepared for the whole range of attacks. So do I think that on the offensive system of deployment. I also believe that if we are ever going to get to a place where, if I could use the term, there would be a "rational" analysis about cost effectiveness and how we create doubt, you have to have these things postulated against something similar.

We cannot make a rational judgment over here if we have the offensive side saying look, that attack won't ever happen, and the defensive side that we are prepared against it, and then we are trying to compare really apples and oranges then, because you have no basis for comparison.

So, it leaves the decisionmakers, it seems to me, in the executive and legislative branches in a hopeless situation, trying to make objective judgments.

Enough said.

I am not criticizing your scenario now. I am just saying that something is out of whack.

General HERRES. Yes, sir, and I don't understand why they discount that possibility. It seems to me it has to be able to cope with that.

Senator NUNN. Thank you, Mr. Chairman. I am sorry that I have overstayed my time and I apologize.

Senator EXON. Not at all.

First, let me say that the two Generals did not give you a direct answer to your question. They evaded the question that you asked them very directly of how many times are you going to have to get reelected before the decision is made.

[General laughter.]

My best judgment, for what it is worth, is if we could double the term of a U.S. Senator from 6 to 12 years and if you could be elected two more times, then we might be somewhere in the range. So take that for what it is worth.

Senator NUNN. I think I might only make it through Milestone III myself.

[General laughter.]

Senator EXON. Senator Warner, we will go to you in just a minute. I have not yet had my first round with General Abrahamson.

General, let me get down to the effectiveness of the boost phase kill capabilities and what you see currently in that.

Let me phrase my question in this fashion. What assumptions do you make about decisions and response times for your man in the loop, C^3 system, and on that basis, how does the success rate during the boost phase for the space based kinetic kill vehicles vary the function of the decisions on time?

General **Abrahamson**. I think, Mr. Chairman, that you are at a very vital decision, and General Herres and I have had quite a few discussions about that. Let me try to answer you directly. But I would like also to put it into the perspective of an operational system and what I think has to be there.

The assumptions are that for most of the reasonable kinds of boosters, and that is today's boosters and even some of the things that they could make that are faster, but not necessarily the rather incredible fast burn boosters that are often talked about by some of our critics, and, by the way, a [deleted] booster, while it is theoretically possible, has huge implications for the entire missile force.

This is why I wanted to stress the threat as a reasonable threat and something that we are working against.

Now, for the answer.

We normally assume that the Soviet Union is cloud covered and that means that you might not get breakout of those clouds for between [deleted] and, therefore, that is a worst case kind of scenario, and, in fact, much of the Soviet Union is cloud covered for a significant period of time.

That means that the sensors, the space based sensors, the satellites in geosynchronous orbit, would only begin to see the missiles coming after about those initial [deleted].

Senator **Exon**. Let me interrupt you, General.

I compliment you for figuring it this way because, if the Soviet Union were going to launch an attack against us——

General **Abrahamson**. They would make it the worst case.

Senator **Exon** [continuing]. It is likely that they would do it on the most cloudy day that they could find. Right?

General **Abrahamson**. Absolutely, sir.

Senator **Exon**. We, therefore, have to consider all of these worst case kinds of issues.

After that, the sensors see a large number coming and, just like our warning systems do today, the important thing is that that information get to several places.

Now, today it has to get to the team of people that General Herres used to command and still, obviously, they report through the Unified Space Command to him, the people that make judgments that, yes, there is a real attack underway. Under today's systems, they do not have all of the most desirable things that we would think are necessary. But they can make an attack, and I have gone off there and watched those folks. It is a rather terrible scenario as they make a judgment and go through the process of saying that we have a probable attack, and they notify people, and then they get along a little further and they say they have an independent confirmation from different sensors and different people, and, finally, they say clearly that yes, it is an attack, there is no question about it.

That takes them some time because of the limits of what they have.

We believe that you must, in fact, make that judgment that it is a real attack and be able to respond within between [deleted].

Now, what are we asking of the system in order to be able to do that?

What we are asking is that the warning get transmitted to the decision makers just immediately and that you have to have more than the warning. You have to have ways in which independent means can look out and see those things coming and say yes, we are absolutely sure that a real attack is coming.

General Herres has discussed with me, then, how can we ensure that that information is made available to a decision maker in a way that you don't have to talk about it, but it is quite clear that he has independent confirmation. That, of course, is the key element, because the decision that is being made is already in the satellites. They are already doing the necessary things. [Deleted.]

Senator EXON. Now let me understand this. I am a layman.

General ABRAHAMSON. By the way, this is not approved yet. We are talking about concepts that General Herres and the JCS are going to say they want to make sure that is going to work.

Senator EXON. But what you are saying, then, is if the system works and if we can finally get through the cloud cover and see this, when that happens, then there would be the authority by whomever is running things or automatically on the spot to [deleted].

Is that correct?

General ABRAHAMSON. We think that is a necessary thing. Yes, sir. Otherwise, you cannot respond in time.

Senator EXON. Otherwise you won't have time.

General ABRAHAMSON. That's right.

But the human being still has to be there in order to insure that there is that judgment, and that human being then, what he allows is an enable command to go in.

Now, this is just our thinking and, again, it requires approval by the JCS because—and this is probably one of the most important elements of what they have—but in order to operate in this kind of time line, you have to be able to do that kind of thing.

Now, what that means to me in terms of the system requirements, is that the most important element is the information that is provided on a second-by-second and minute-by-minute basis during peacetime, not necessarily during war. This is because in order to have the assurance that the system is able to operate and that they are getting the proper information, the way you get that assurance and that confidence is by having people working on it 24 hours a day and getting the kind of reports that the peacetime operation shows that it works.

When the peacetime operation shows that it works, and they show that it is working in lots of different ways and in lots of different tests, then you don't need much information in order to make the decision. In fact, what you need is just have you got a reliable signal.

Senator EXON. My time is up, but let me follow up.

SPACE-BASED KINETIC KILL WEAPON

If the system works flawlessly, and warning is given in a timely fashion, and the space based kinetic kill weapon performs as programmed, what would be the kill ratio in the boost phase?

General **ABRAHAMSON**. In the boost phase? I have to now remind you that there are lots of different scenarios that apply to that.

Senator **EXON**. What is the best and the worst case?

General **ABRAHAMSON**. Let me give you some specifics here, at least in terms of the ones that I have talked about.

Senator **EXON**. It would not be 100 percent?

General **ABRAHAMSON**. Oh, of course not.

Actually, with the kind of architecture that we laid out, about [deleted] percent of the satellites, each with 10 interceptors or more, but at this point our architecture lays out 10 interceptors, would be over the Soviet Union, and by "over the Soviet Union," that does not mean that they are right there, instantaneously over the Soviet Union, but that they would be in a position to fire at missiles coming out of the Soviet Union or bastions. Obviously others would be in a position to cover the rest of the globe, other submarine launched areas or other things.

But about [deleted] percent would be in that position.

Senator **EXON**. But [deleted] percent of what would be in that position?

General **ABRAHAMSON**. Of the space-based carrier vehicles with their interceptors—they would be in a position that they could fire and hit these missiles, either in the boost phase or in the post-boost phase. I have included both of those because you get the same effect.

Senator **EXON**. General, what percentage of these——

General **ABRAHAMSON**. Excuse me, sir. I am not trying to buy time here. I am just looking through these papers for the right numbers for you.

General **HERRES**. While he is looking, I might explain one point that might be helpful in your thinking this thing through.

[Deleted.] That would be kind of an outside figure.

Senator **EXON**. General Abrahamson, do you have the answer now?

General **ABRAHAMSON**. Yes, sir.

There are several scenarios. Again, perhaps the most optimistic one here is about [deleted] percent, a fairly large percent, in the boost phase alone, killing number of RVs.

Senator **EXON**. It's [deleted] percent?

General **ABRAHAMSON**. Yes, in this one scenario.

Senator **EXON**. And it goes down to where?

General **ABRAHAMSON**. It goes down to maybe slightly less than that, that is, of the total numbers killed.

So it is a fairly substantial percentage.

Senator **EXON**. You would get [deleted] percent of them?

General **ABRAHAMSON**. This is one scenario. They might go a little bit down to [deleted] percent, but, generally, it is in that kind of area. There are a whole series of assumptions, you know, what they are that they shoot and so on.

General HERRES. But that does not mean if everything works perfectly.

Senator EXON. Thank you.

Senator Warner.

Senator WARNER. Thank you, Mr. Chairman.

Gentlemen, I would like to go back and make a general observation.

I have not had the benefit of all of the testimony today, but I want to make sure this record, as it is examined, reflects—and this is my belief—that SDI provides a uniqueness to our overall deterrence. This makes it a program to which this country and the Congress should give continuing special support as they have so far.

Now, it is true that, if you want to add to and augment uncertainty, mobility is going to do that. If you want to get survivability, you can go to more hardness. We can figure out a lot of things.

But through the years that I have been working here, I have always been of the opinion that SDI has its own unique contribution to the overall deterrence formula.

I personally do not subscribe to the President's characterization of the umbrella, and I have said that publicly. Short of that, I believe it is essential that we do beget some parallelism between the defense and offense and how we measure that will depend in years to come on the technical milestones that are achieved.

I wonder if each of you, just in a very brief way, would give your characterization as to why SDI provides an element of uniqueness to deterrence.

General HERRES. I think you have made a very good point there, Senator Warner. The first, and most important, aspect of the uniqueness is that you don't have to threaten with offensive weapons to make a contribution to deterrence. You can make an incremental contribution to deterrence without introducing more threatening weapons into the world's inventories of arms, and that is very significant. The President has stressed that many, many times, and I think that is pretty significant.

If we can find more and more ways to do that, we will have turned the corner on what amounts to a breath-taking arms race that has taken place since World War II.

That is the first, and most important, part.

The other thing is something that I have stressed before, which is that there are other things that you can do with a defensive system that the offensive system cannot do.

I worry about the day when there are irrational people. You know, deterrence works against the Soviets because we assume that they are rational and they assume that we are rational and they are not going to commit——

Senator WARNER. That is a fundamental concept of deterrence.

General HERRES. Yes, sir, as long as we have the force structure that makes their choices poor choices.

MULTI-POLAR WORLD

But there is the great concern, in my view a serious one, that some day these weapons of mass destruction and delivery systems are going to be in the hands of others. What happens when there are submarines on patrol with nuclear weapons on board and they are not all from one country, or from one adversary? I don't know what kind of world that is going to be, but we are moving into a multi-polar world. You know, I mean when there are submarines on patrol with nuclear weapons on board and they are not all Soviet submarines. That is what I worry about.

Senator **WARNER**. Are you talking about one submarine?

General **HERRES**. Two, or three, or five. What if the Qadhafi's of the world had nuclear submarines?

Senator **WARNER**. So you are not talking about individual submarines?

General **HERRES**. Well, it could be just one.

Senator **WARNER**. I may be off the track here.

General **HERRES**. I am talking about third countries having those kinds of capabilities. What happens when the Qadhafi's of the world can have their own submarines with nuclear weapons on board——

Senator **WARNER**. Now I understand you.

General **HERRES** [continuing]. And they launch a missile? Deterrence works if you know that that missile coming out of the ocean belongs to the adversary, to an adversary. But what if there is more than one adversary and you don't know how to nail that down?

Senator **WARNER**. In other words, the Soviet Union, absent our allies, possessed submarine strategic capabilities.

General **HERRES**. SLBM capabilities.

Senator **WARNER**. But if other nations were to build submarines that incorporate weapon systems, one or more nuclear weapons on them, you have a new problem. That is a good point.

General **HERRES**. Yes, sir. That is a new problem.

Senator **WARNER**. It is a question of who do you hit back when this thing suddenly appears out of the ocean.

General **HERRES**. Exactly. The kind of deterrence we have depended on in the last 40 years does not work anymore. Maybe it is a remote point, but there are some who say maybe a cheaper way to do that is the Volkswagen bomb scenario and those kinds of things.

Maybe—maybe not. I just don't know. And I am not sure that you would want to justify the system solely on that basis. But it is one of the things that the system can do that is unique.

[Deleted.]

Those are other contributions, unique contributions, that a defensive system can make.

Now, clearly if it costs the Gross National Product to build it and other forms of deterrence are much, much cheaper, then as Senator Nunn implied, you are going to have tough decisions to make. You know, you have to make that balance.

But if you are talking comparable costs for what seem to be—and, again, it is a qualitative judgment—comparable amounts of deterrence, then SDI and the kind of Phase I system that we have described could be a very important step.

Senator **WARNER**. Thank you.

General Abrahamson, did you have a comment on that?

General **ABRAHAMSON** Yes, sir, I do.

I would first like to qualify it by saying that my background is development and acquisition and research. Therefore, neither my expertise nor my position is one that says that I am in the requirement area.

Senator **Thurmond**. Would you speak a little bit louder, General.

General **Abrahamson**. Yes, sir.

But, nonetheless, I have been thrust into the middle of what has clearly been one of the most acrimonious and difficult debates that the Nation has embarked on as they are looking at the differences between offensive-only kinds of deterrence and defensive kinds of deterrence.

I guess the thing that has struck me as an individual and not as an expert in this is that deterrence is a psychological phenomenon. Deterrence occurs in the mind of the Soviets, in the mind of our own people, and the Soviets are concerned that we are deterred.

General Herres has raised the question that when others finally get these capabilities, they may have different motivations, different kinds of things.

So, as I look both at our body of nuclear theory and all of the discussion that has been made, and as I look even further than that and try to go back over the history of how wars start in general, I believe that there are certain characteristics; that you can see those characteristics in the beginning of World War I, World War II, and maybe in Vietnam and those places as well.

Several of the characteristics are these. First, neither side understands totally in a crisis the motivation of the other side, and they certainly don't understand what their plans are and what they are going to do.

If you go back to the beginning of World War I, there is a documented account that Bismarck tried to stop the war and tried to divert the troops, instead of rushing at each other, as they all were doing with the help of the railroads, to divert the troops and to stop it on the European side, and to deal with the Soviet threat, and he couldn't do it.

When you add that uncertainty and the fact that you are dealing with psychology and you never know what the other side is doing, I think that when we are talking about the risk of the nuclear destruction of the planet, in fact, we must have means to deal with that uncertainty, and defenses do have those unique means, and offenses-only do not have that.

In other words, offense-only deterrence is fragile. It is fragile in that it does not handle these unknowns that are the beginning of every war.

Senator **Warner**. Thank you, Mr. Chairman. My time is up.

I observe that defense has the unique advantage of saving lives if deterrence were to fail.

Senator **Exon**. Thank you, Senator Warner.

Senator Thurmond.

Senator **Thurmond**. Thank you very much, Mr. Chairman.

General Herres, in your former role as Commander-in-Chief of the Space Command, you were very supportive of improvements to our space warning and space surveillance capabilities.

Today, most of those initiatives are included in the SDI program, by the way.

Do you believe that the Phase I program now underway gives adequate attention to these requirements that would exist independent of SDI?

General HERRES. Well, the centerpiece of the improved capability that is coming down the line is the boost surveillance and tracking system. We have defined the requirement. It was to be a follow-on of our current space-based warning system, and that program was in its very early stages when General Abrahamson's office was formed and the Secretary assigned all of the relevant technologies to his management.

I know that General Abrahamson—we have talked about this many times—I know that he is very cognizant of the criticality and the importance of that requirement.

I think every responsible individual in the Pentagon knows that we need a boost surveillance and tracking system no matter what the outcome of the SDI program is.

I think that that system is progressing at as rapid a pace as one reasonably could expect, given the level of funding that we are experiencing. In fact, some might even argue that it might be getting better funding than otherwise would have been the case. I am not sure. But I think it is progressing rapidly.

There are other critical improvement systems as well. But that I think is the best example.

The space surveillance and tracking system was another one that was important to us—not quite as high a priority as the boost surveillance and tracking system. But it is getting the kind of attention and work that it needs.

I think we are doing just as well, if not better, than if those programs had not been put into the SDI program.

PHASE I STRATEGIC DEFENSE SYSTEM

Senator THURMOND. General Herres, in putting forth the requirement for a Phase I strategic defense system, did the Joint Chiefs consider the budgetary implications of fully developing and deploying such a system, and, if so, what were those budgetary implications?

General HERRES. No, sir.

We decided at this stage of program evolution that it really would not be appropriate for us to try to constrain the requirement with some resource boundaries at this point. That will come as the acquisition process continues. That is sort of the nature of the process.

The process is structured so that we start with the requirement on the one hand and the relevant technologies and opportunities to meet that requirement on the other hand, and both mature and evolve down the road as time goes on. The time to compare the resources against the requirement will be—well, there is an opportunity to do it in a broad sense at Milestone I, but, most significantly, at Milestone II.

That is the point in time when concept validation is complete, at which the risks must be evaluated in comparison with the resources involved, the risks of what it takes to meet the requirement.

Now, I would add that the concept validation phase costs a lot of money for a program like this, and I want to make sure that everybody knows I recognize that. So there is sort of an implicit judgment made at Milestone I, and it is a collective decision, both by the Joint Chiefs of Staff in developing the requirement, and by the Defense Acquisition Board in authorizing the beginning of that concept of the validation phase, that the likelihood of achieving the requirement, of meeting the requirement, is good enough, is high enough to justify the expenditure of the concept validation phase.

This gets you to the next decision point, where you have to make another judgment.

ACCIDENTAL LAUNCH PROTECTION SYSTEM

Senator **Thurmond**. General Abrahamson, in your opinion, what space-based components, if any, would be necessary to support an accidental launch protection system?

General **Abrahamson**. Sir, the most important elements for an accidental launch system are an adequate sensor, so that you can see the fact that the accident has happened, that the missile is on the way toward the United States, and you can see it early enough so that you can put a ground-based interceptor or a something very quickly in that direction. So, it is sensors.

The best sensor is something in space that can track very accurately and, therefore, the most valuable set of sensors might be a satellite like the BSTS or a partial capability after that.

However, in terms of putting weapons in space, I don't believe that is necessary because what we are trying to do is protect the United States against a very small attack. This is quite different than the fundamental requirement that General Herres described, where we are trying to add to deterrence by introducing a large measure of uncertainty.

Senator **Thurmond**. Thank you very much.

Thank you, Mr. Chairman.

Senator **Exon**. Thank you, Senator Thurmond. I have just a few more questions and then we can wind down.

I want to thank you gentlemen very much for this long session. It has been a very important one and I thank you for coming over.

SS-18 FORCE

General Abrahamson, if much of the claimed success of the SS-18 force using the SBKKV comes during the mid-course phase, which we have talked about today, wouldn't it be relatively simple for decoys to be released at the time the RV was released, and wouldn't that significantly decrease the effectiveness of the overall system?

General **Abrahamson**. Sir, as we put together this architecture, we had to consider not only just what will meet the numerical requirements that the Joint Chiefs have laid out, but what gives us the most robust possibility of blocking certain Soviet responses, particularly ones that would be very difficult for us to deal with, and what would be the most resilient kind of system, and the combination of a space-based ability to destroy boosters or post-boost vehicles in combination, then, with ground-based systems for survivability and for the ability as the best way to attack in later phases. That is what we have presented, and I believe that the DAB recognized the strength of that.

Now, to be specific, if you had no boost phase system at all, or nothing that would threaten even the post-boost phase, then your thesis is exactly correct. The Soviets would have a fairly simple and fairly straight-forward response, and that would be to just build the best decoys that they possible could.

Therefore, you have told them, by omitting that particular option, you have told them the right way to go, and they could probably do that fairly cheaply. And, in fact, our research is investigating exactly what they could do and what is reasonable to do that.

So I think your thesis is correct.

So, it is not enough to consider how many kills do you get in one phase versus another phase, or how much does one phase cost, but how do they work together in order to block certain Soviet responses so that the total system can achieve what the JCS has acquired us to achieve; and that is an effective deterrence system.

Senator EXON. General Abrahamson, there are so many questions here. This is not said by way of criticism at all, but I think you sense some concern on the part of the committee and I don't think you have ever intentionally overstated the case here. You know that I, for one, was very upset and expressed my concern to you on several occasions, that we were misleading people with those ridiculous ads that were on television of the little girl and things bouncing off the umbrella. I just thought that was a disaster for anyone who was trying to look at this as you have been. When I say "you," I mean General Herres and the Joint Chiefs also.

But you said in an earlier question that somewhere between [deleted] and then we would go to the next phase.

Since you are only required to get [deleted].

General ABRAHAMSON. Let me make sure that I did not give you the wrong impression.

The number that I talked about in terms of [deleted]. That was of the total.

Senator EXON. Oh, of the total.

General ABRAHAMSON. The total, yes, sir. Actually, the distribution in general runs something like this.

[Deleted.]

But each of these things works together in such a way that they present the Soviets, particularly that planner, a slightly different problem. We think that there is some very real advantage in having these layers work together.

If we had a way that we could guarantee that you could destroy them all in the boost phase, boy, that is what I would go for.

Senator EXON. My last question has to do with what the Soviets have continually said, General Abrahamson, and I would like to get both your response and General Herres' response to this. I suspect they will be the same.

The Soviets have continually said, for what it is worth—and I don't buy things that they say—they say that they are not worried about SDI. Yet they obviously are because I think it has made a significant difference in the way they approach things.

But they continually say that they are not worried about SDI because they can overwhelm the system.

The more I hear and the more I see, if I were the Soviet Union and I were convinced that 15 years from now or 20 years from now the United States would indeed have something that were effective—whatever the percentage is—against the boost phase and the post-boost phase, and then a clean-up of some kind for the ones that get through, I would have to think that the more and better missiles I could build and the faster I could build them to overwhelm the system to the point that the United States would decide that this program were not cost effective—because even if we got 80 to 90 percent of their incoming missiles, they could still overwhelm us with 2,000 or 3,000 or 4,000 that would get through—that is what I would think. What is the answer to that?

That question comes into my mind and I suspect it is in other people's minds. We are back at cost-effective. If we could ever make that umbrella that the little girl had work, that would be great. But I don't see that happening.

Reassure me on this, will you?

General HERRES. Well, I am not sure that that has to happen.

That certainly is a worrisome scenario and it raises a lot of profound questions.

I personally tend to think that, first of all, you have to be able to make the case that a less than perfect defense can do to make the significant contribution that you would expect of the system to justify its expense. There is not any question that expense is a factor. If he is going to drive you to bankruptcy by building more missiles more cheaply than you could build a defensive system, then you have not gotten very far and you have made great mistakes.

If you can show that a less than perfect defense does make a contribution in the way that we have described it, [deleted] then you might find that the contribution is significant.

But I certainly would not want to discount the fact that what it costs will make a difference in the end. What you all have discussed does matter.

There is an order of magnitude relationship between the costs here that has to be taken into account.

I happen to be a believer that a less than perfect defense can make a significant contribution if we do it right, if we do exploit the technologies properly. I think that is within our capacity to do.

Senator EXON. General, would you care to add anything?

General ABRAHAMSON. Well, I think General Herres has said it and said it very effectively. Let me just build on his last point—if we exploit the technologies correctly.

I, frankly, have a very difficult problem trying to say what something costs in the Soviet system and to be able to meet that cost exchange requirement, to calculate that. But I can give you what I think is a very graphic example of what we are trying to do to make it happen.

At some point, if you would like, in one of your hearings I can show you a model of what a space-based interceptor might look like. It is about that tall [indicating]. It will have some fairly expensive parts in it, but it is small. The missile that it will knock out, hopefully, will be an SS-18. That is seven stories high and weighs [deleted] pounds. It has 10 warheads on it. Those are complicated and they cost the Soviets a lot to make.

We are not going to bring forward—and it is clearly my responsibility to insure that when the time comes that somebody bring something forward—we are not going to bring forward something that is not cost effective in the sense that it does not allow us to be on the right end of that cost strategy relationship.

This is one of the reasons the program costs so much, because we have to do research in that area to make that come true. If we only had to prove technical feasibility, that would be pretty easy.

Senator EXON. Thank you.

I would like to request that there be an understanding that the record be kept open for 24 hours for additional questions for some of the people who could not appear here today and maybe some additional questions which we will have here.

I thank you again, gentlemen, for coming over today. You have been helpful and forthcoming, as usual. I speak for the committee when I say that we appreciate it. We will look forward to seeing you, I believe, on the 21st, General Abrahamson.

General ABRAHAMSON. Yes, sir.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

Senator EXON. [Deleted.]
General HERRES. [Deleted.]

START REDUCES U.S. WARHEADS

Senator EXON. Would the JCS accept a situation in which START had reduced U.S. warheads by 50 percent and the Soviets, at the end of a specified ABM nonwithdrawal period, deployed an expanded ABM system capable of attriting 40 percentage of a U.S. retaliatory strike? Put another way, how would you regard a future strategic balance under which the United States could attrite 40 percent of the first wave of a Soviet attack but the Soviets could attrite 40 percent of the remaining U.S. retaliatory forces?

General HERRES. A future world in which both sides possess ballistic missile defenses, especially under a START treaty regime that constrains and balances U.S. and Soviet offensive forces, could potentially enjoy a level of deterrence and crisis stability enhanced over that of today. The existence of capable defenses, coupled with decreases in offensive forces that nevertheless maintain a credible retaliatory capability, would introduce extreme uncertainty into nuclear war planning. This would add a new element of deterrence, based upon denial of strike objectives, to the long-standing element of deterrence based upon threat of retaliation. Additionally, such defenses would provide protection against third country threats and accidental or unauthorized launches.

ABILITY OF BALLISTIC MISSILES TO PENETRATE SOVIET DEFENSES

Senator EXON. From the point of view of the Joint Chiefs, should the United States strive to ensure the ability of our ballistic missiles to penetrate Soviet defenses even as we seek to eliminate the ballistic missile threat to the United States? How do you reconcile this with cancellation of the Minuteman penetration aids program?

General HERRES. The United States will continue to rely upon its strategic offensive forces to maintain deterrence, especially during the early phases of ballistic missile defenses (BMD). Even in later BMD phases, a balance between strategic offensive and defensive capabilities will be required to maximize deterrence by the compounding effects of the U.S. defensive threat to Soviet war plans and the U.S. offensive threat to Soviet high-value targets.

The cancellation of the Minuteman penetration aids program was a cost savings measure in the face of current budget realities. [Deleted.]

PHASE I (BMD)

Senator **Exon**. Is the Phase I requirement a *prioritized* requirement? Have you begun to address the cost-tradeoffs you may eventually have to face if a strategic defense is ever deployed? Have you begun to consider how many Army divisions, carrier battle groups, and air wings SDI may cost you? What are the implications for our global conventional commitments, which already have us stretched pretty thin?

General **Herres**. In developing their requirement for Phase I Ballistic Missile Defenses (BMD), the Joint Chiefs of Staff did not prioritize the requirement with regard to other existing military needs. Such prioritization occurs as part of the DOD Planning, Programming, and Budgeting System (PPBS). DOD does, of course, face a number of strategic and tactical force needs which compete for limited fiscal resources. This will continue to be true in an era of strategic BMD. Should a national decision to deploy strategic BMD be made, the resource needs of the BMD system would compete in the PPBS for satisfaction in the appropriate fiscal years.

ABM TREATY-COMPLIANT STRATEGIC DEFENSE SYSTEM

Senator **Exon**. General Abrahamson, in your testimony you referred to a study presented to the Secretary of Defense on a ground-based, ABM Treaty-compliant strategic defense system. Could you provide the main conclusions from that presentation and describe how that system differs from the current Phase I system in terms of components required, timetables for deployment, and the scale of deployment?

General **Abrahamson**. The study in question addresses a special case of protection against a small number of accidental or unauthorized launches as suggested by Senator Nunn. It should not be considered as a strategic defense system of significant capability.

This study is still in progress, but it does appear that some protection of the Continental United States against a small number of ICBM launches can be achieved by a relatively modest ground based system, perhaps with interceptor missiles based at Grand Forks. The question of whether such a system would comply with the ABM Treaty is similarly still under study.

FULL-SCALE DEVELOPMENT OF PHASE I

Senator **Exon**. We have heard that the new decision point for full-scale development of the Phase I system has slipped from 1992 to 1994. That would presumably mean that the full-up Phase I system could at best be in place in the late 1990s or around the turn of the century. What can we expect Soviet booster technololgy to be by the turn of the century and how effective will Phase I systems be against that technology? How do you respond to allegations that the SBKKV will be cost-effective, if at all, only against current "slow-burning" Soviet ICBMs, and that the SS-25 and SS-24 already represent booster technology that is too fast for the SBKKV?

General **Abrahamson**. The Phase I system presented to the Defense Acquisition Board included an SBKKV element that is effective not only againt the "slow-burning" current ICBMs (SS-18 and SS-19), but also against the SS-24 and the SS-25 and potential follow-ons to these systems. The baseline SBKKV is effective against all these systems during boost phase, and in fact, against all boosters with burn times greater than [deleted] and burn-out altitudes higher than [deleted]. Moreover, the SBKKV is fully effective against the post-boost vehicle (PBV) or busses, and this remains true even if booster burn times were reduced below [deleted].

SS-18

Senator **Exon**. For a representative set of cases you have studied for the Phase I system against the "leading edge" attack, please provide the following data in terms of SS-18 and "other":

(a) The number of boosters launched and engaged (including multiple attacks) during boost phase and the number of boosters and RVs destroyed;

(b) The number of busses engaged (including multiple attacks) during post-boost MIRVing and number of RVs destroyed.

(c) The number of RVS engaged during (including multiple attacks) and destroyed during midcourse;

(d) The number of RVs surviving to target impact;

(e) The number of SBKKVs in total deployed, and the number attacking boosters in the boost phase;

(f) The number of SBKKVs attacking boosters during post-boost MIRV dispensing;

(g) The number of SBKKVs fired at RVs or decoys (if any) during midcourse; and

(h) The number of SBKKVs remaining in the deployed inventory at the end of the "leading edge" battle.

General **Abrahamson**. I believe it is important to answer this question in the context of the JCS operational requirements, even though our analyses have considered other possible threat cases. As such, we focused on the JCS requirements—[deleted].

Questions Submitted by Senator Carl Levin

TWO-SIDED BMD DEPLOYMENT

Senator **Levin**. A memo from the Defense Science Board to the Under Secretary for Acquisition dated August 1987 noted that "the requirements process should be broadened to include an analysis of the desirability of deployment which includes a consideration of a two-sided BMD deployment. This question must be posed as follows: If the United States has a choice between (1) no further BMD deployment on either side, or (2) a U.S. BMD system meeting JCS requirements on the U.S. side, plus an equivalent system on the Soviet side, which of these alternatives more effectively enhances U.S. security?"

Has the JCS conducted such an analysis?

If yes, what did that analysis show? Is it available for review by Members of the Senate?

General **Herres**. The Joint Chiefs of Staff have not conducted a formal, two-sided analysis of strategic defenses. The Joint Chiefs of Staff considered available single-sided (red offense on blue defense) analysis when developing the Phase I Ballistic Missile Defense (BMD) requirements. A more advanced Joint Staff simulation and analysis capability is in the process of being assembled and should be available to support JCS participation in the Defense Acquisition Board review of the Phase I BMD system scheduled for the fall of 1988.

The Joint Chiefs of Staff do believe that should both sides possess ballistic missile defenses, especially under a START treaty regime that constrains and balances U.S. and Soviet offensive forces, deterrence and crisis stability could potentially be enhanced over that of today. The existence of capable defenses, coupled with decreases in offensive forces that nevertheless maintain a credible retaliatory capability, would introduce extreme uncertainty into nuclear war planning. This would add a new element of deterrence, based upon denial of strike objectives, to the long-standing element of deterrence based upon threat of retaliation. Additionally, such defenses would provide protection against third country threats and accidental or unauthorized launches.

PHASE I SDS DEPLOYMENT

Senator **Levin**. In the hearing I asked you whether the JCS concurred with General Abrahamson's unclassified statement that the current design for Phase I SDS deployment is capable of meeting the JCS requirement.

Was your answer to the question classified?

General **Herres**. No, the answer to that particular question was unclassified. Specifically, we believe that satisfaction of the JCS ballistic missile defense (BMD) operational requirements by a future defense system like the Phase I Strategic Defense System is probably achievable, but not an absolute certainty. That element of uncertainty in both the final BMD system configuration and its effectiveness drives the need for continuing review throughout the DOD acquisition process.

Senator **Levin**. [Deleted.]

General **Herres**. [Deleted.]

ADVANCED LAUNCH SYSTEM

Senator **Levin**. General Abrahamson, you gave several estimates to the committee regarding the approximate time lines for making a national decision to proceed with Phase I SDS deployment and for actually deploying such a system.

Did those estimates assume the availability of the Advanced Launch System (ALS)? If they did, what would be the time lines without ALS available?

General **Abrahamson**. The deployment estimates do assume continued development of the ALS as an SDIO/NASA/AF program and its availability during the deployment phase. What we are concerned about in the present debate is an adequate research program to give our Nation's decisionmakers enough confidence to make initial deployment decision in the early 1990s. The availability of an ALS capability is a critical piece of information to provide that confidence. The full-scale development phase could use existing launch systems; a deployment would require the launch capabilities planned for ALS.

TWO-SIDED BMD DEPLOYMENT

Senator **Levin**. An August, 1987 memo from the Defense Science Board to the Under Secretary for Acquisition on SDI noted that "the requirements process should be broadened to include an analysis of the desirability of deployment which includes a consideration of a two-sided BMD deployment. This question must be posed as follows: If the United States has a choice between (1) no further BMD deployment on either side, or (2) a U.S. BMD system meeting JCS requirements on the U.S. side, plus an equivalent system on the Soviet side, which of these two alternatives more effectively enhances U.S. security? Has the United States conducted such an analysis? If yes, what did that analysis show? Is it available for review by members of the Senate?

General **Abrahamson**. This question involves broad specific security issues and concerns and most appropriately should be addressed by the JCS. They, of course, are responsible for military judgments of this nature. Within SDIO, we are concerned about this matter from the more narrow perspective of the contribution defenses could make in denying the Soviet Union confidence that it could launch a successful first strike against the United States and our allies. Nevertheless, we are beginning a study of broader deterrence issues and anticipate initial results within a few months.

Questions Submitted by Senator John McCain

FUNDING LEVELS FOR SDI

Senator **McCain**. Could you describe the funding levels you will seek in fiscal year 1990, fiscal year 1991, fiscal year 1992, fiscal year 1993, and fiscal year 1994, and indicate the level of spending that will take place in each year for any activities that would lead to experiments that will go beyond the narrow interpretation of the ABM Treaty? Could you provide a detailed analysis of the projected SDIO budget for fiscal year 1990–fiscal year 1994 for the record, and of any expenditures on activities that go beyond the narrow interpretation of the ABM Treaty?

General **Abrahamson**. The funding level for the DOD portion of the SDI program submitted with the current, amended fiscal year 1989 request is $4.55B (down from last year's estimate fiscal year 1989 budget of $6.3B). For the outyears, the projected SDI funding levels are still being reviewed within DOD. However, early estimates forecast a reduction from previous projections in outyear funding levels which would be consistent with the reduction applied in the amended fiscal year 1989 budget request.

No expenditure of fiscal year 1989 funds will be used for tests that go beyond the narrow interpretation of the ABM Treaty.

ACCIDENTAL LAUNCH PROTECTION

Senator **McCain**. How would your current program change in each year from fiscal year 1989 to fiscal year 1994 if we reduced Phase I to providing the kind of accidental launch protection suggested by Senator Nunn, and how long could we then delay experiments that would violate the narrow interpretation of the ABM Treaty? Could you provide a detailed analysis for the record?

General **Abrahamson**. Even if an initial phase of a strategic defense system were limited to provide only accidental launch protection, there would still be a need to continue conducting experiments to validate technology for improved follow-on systems to counter evolving threats. Experiments for improved follow-on systems such as advanced kinetic energy and directed energy weapons would require examination for treaty compliance in fiscal year 1988 and fiscal year 1989 so that these experiments could be conducted in the fiscal year 1990–1994 period.

INF TREATY CUT BACKS IN SPENDING

Senator **McCain**. What cut backs could we make in the program to achieve the same level of protection and capability if we carried out the INF Treaty and the administration's proposal for START? To what extent, if any, could we delay tests that would violate the narrow interpretation of the ABM Treaty? Could you provide details for the record?

General **Abrahamson**. The JCS Phase I operational requirements addressed a Soviet attack structure of some [deleted]. Certainly, START could cause a change in the ballistic forces of the Soviet Union, and the Soviet ability to execute multiwave attacks on the United States would be dramatically reduced. While Soviet compliance with such a START treaty might have a substantial impact on the ability of the Phase I system to handle Soviet follow-on ballistic attacks, an implemented START treaty would not reduce the operational requirements for an initial wave attack and the requirements we are working to meet with respect to Phase I.

With sufficient funding, the program can go forward in a manner consistent with the narrow interpretation. The real question is how much information future decisionmakers will need to make the decision on full scale development. Our tests are designed to provide pieces of the puzzle, and we will have a number of system simulations planned to remain within the treaty. Integrated tests involving all elements may be deemed essential to that national decision by a future administration. This is when the interpretation of the treaty must be weighed against the confidence we have in our research results.

AIR DEFENSE AND ATBM

Senator **McCain**. What progress is being made in air defense and ATBM to provide protection against the threats not affected by SDI? Could you provide the details for the record?

General **Abrahamson**. The Presidential Charter to the Department of Defense and the SDIO stressed the need to ". . . develop technologies to defeat missiles of all ranges that threaten the United States and its allies." Given this charter, the SDIO is supporting a variety of research activities that will enhance the defense of U.S. and allied forces in a theater or regional battle. This work is being accomplished in coordination with the Army, who has overall responsibility within the DOD for the near term Anti-Tactical Ballistic Missile program. [Deleted.] The SDIO program orients on providing depth to the battlefield in terms of missile defense layers in both altitude and echelon. SDIO support of the Israeli ARROW experiment and the Extended Range Interceptor Program are two examples of missile technologies being evaluated at this time. The results of these experiments will be available in 30 to 36 months. Other SDIO programs that will benefit theater missile defenses include the development of hypervelocity guns with guided projectiles, improved ground and air based sensors, the Extended Air Defense Test Bed and detailed analysis of theater defense needs in terms of architecture analyses.

SPENDING CAPS FOR SDI RESEARCH

Senator **McCain**. What kind of program can you create if you see a cap placed on your resources of $3.5 billion annually? Of $2.5 billion annually? Could you provide the details for the record?

General **Abrahamson**. Either of those funding levels would be devastating to essential research activities. At $3.5B annually, the SDI program would be reduced to a technology base program that could not support the range of demonstration and validation of experiments necessary to entertain a full scale development decision for a strategic defense system. The SDI research program has arrived at the point where demonstration and validation experiments, which are relatively expensive, must be conducted in order to refine system designs and concepts. For example, if a demonstration and validation flight program for the BSTS satellite were continued, it would be at the expense of canceling several of the other major system element experiments related to the Space-Based Interceptor, the Exoatmospheric Interceptor Vehicle and the Ground-Based Radar. This is clearly counterproductive to the goal of making an informed decision on the feasibility of an entire strategic defense system. In other words, we would not be able to achieve validation of an integrated system concept because we would only have resources to test a part of the system in a given time.

At $2.5B annually, the SDI program becomes almost exclusively a technology base program. Demonstration and validation experiments for system elements concepts could not be conducted along with a comprehensive research program covering the range of technologies necessary in order to explore ways of countering existing and evolving ballistic missile threats. Clearly, funding must be significantly more than $2.5B per year in order to provide the basis for developing a strategic defense system.

Senator EXON. With that, we are adjourned.

[Whereupon, at 5:18 p.m., the subcommittee adjourned, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

FRIDAY, MARCH 18, 1988

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES
AND NUCLEAR DETERRENCE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

U.S. STRATEGIC DETERRENCE

The subcommittee met in executive session, pursuant to notice, at 2:05 p.m., in room S-407, the Capitol, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Thurmond, and Symms.

Staff present: Robert F. Bott, William E. Hoehn, Jr., Ronald P. Kelly and T. Kirk McConnell, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Milton D. Beach, assistant to Senator Glenn; and James M. Bodner, assistant to Senator Cohen.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. The subcommittee will come to order.

The subcommittee meets this afternoon for the sixth hearing to review the amended fiscal year 1989 defense budget request.

Our witness this afternoon is Gen. John T. Chain, the Commander in Chief of the Strategic Air Command.

The subcommittee is gratified that General Chain is able to join us today, despite his very busy schedule, and a special welcome to you, General. It is great to have you back with us again.

General CHAIN. Thank you, sir.

Senator EXON. We apologize for the slowness and for the attendance today, but it has been a particularly hectic day in the U.S. Senate.

Last year, the committee returned to a previous tradition of holding an annual review of the status of the U.S. strategic nuclear deterrence, under a variety of scenarios and assumptions. Such reviews are consistent with the full committee's continuing interest in and certainly emphasis on net assessment in all fields and all theaters.

I have asked General Chain once again to present the results of a hypothetical strategic attack by the Soviet Union on the U.S. strategic nuclear forces, both for generated and day-to-day conditions, measured in terms of surviving weapons and counter-military potential on both sides.

In addition, I have asked General Chain to provide the same measure of U.S. retaliation against the Soviet residual forces.

The committee has already held its hearing this year on the Soviet strategic threat. Today we will be able to see that threat in action, as it were, and how best we can respond.

General Chain did an excellent job last year on very short notice. In fact, he exceeded our expectations in that he and his staff were able to generate net assessments for a base year, the current year, the end of the FYDP force, and for calendar year 1996.

These assessments were performed for generated and day-to-day conditions, as well as for varying response times.

Having done so well last year with such short notice, the committee's expectations this year are, of course, unbounded. I am certain that we will not be disappointed.

These net assessments are very valuable for the committee. They allow us to see the effects both of Soviet modernization programs and the results, over time of the public's investment in this vital area of our national security.

With that, before we hear from the General, I want to recognize my distinguished ranking member.

Senator Thurmond, I want to congratulate you for the excellent job and help and support that we had in working together on a series of very tough votes today. We finally won out.

I was telling the staff just before I came up here that sometimes we have difficulty getting through to the Members of the U.S. Senate just what they are and are not doing, and I appreciate very much your invaluable help today on that issue.

With that, do you have any opening statement?

Senator THURMOND. Well, your leadership was outstanding on it, and I was pleased to work with you, Senator.

Senator EXON. Thank you.

Senator THURMOND. Mr. Chairman, I join you in welcoming General Chain back to the subcommittee this afternoon.

We benefitted very much from the excellent testimony General Chain presented to us last year, and I look forward to his update of the assessment of deterrent forces.

I cannot stay the entire time, but I will be briefed on the part that I miss.

I have a considerable interest in the General's assessment of the contribution of the Small ICBM to our post-attack targeting requirements, as well as the capabilities of the U.S. forces under a potential START agreement.

I understand the General will be addressing these issues in his presentation.

There have been a number of questions raised in recent months about whether we have gotten our money's worth since initiation of the strategic modernization program in October of 1981.

It would be very helpful to this Senator if General Chain, in the course of his testimony, could highlight those improvements in our deterrent force capabilities that result from our investments in strategic modernization.

Mr. Chairman, I will also have a number of questions for General Chain that I will ask him to answer for the record.

Thank you very much.

Senator **Exon**. Thank you. If you do have to leave, and I know that you have some other business this afternoon also, we will see that those questions are either submitted to the General today or submitted for the record.

Senator **Thurmond**. Thank you very much.

Senator **Exon**. General Chain, welcome again.

Please proceed in any fashion that you see fit.

STATEMENT OF GEN. JOHN T. CHAIN, JR., COMMANDER IN CHIEF, STRATEGIC AIR COMMAND, AND DIRECTOR, STRATEGIC TARGET PLANNING

General **Chain**. Mr. Chairman, Senator Thurmond, thanks for the warm welcome. I am delighted to have an opportunity to appear in front of this committee again this year.

With your permission, I will present an unbounded briefing on U.S. strategic capabilities, both in the near-term and in the future, and I believe that we can make some suggestions, as I go through the briefing, on how best to meet the new demands that have been posed.

I also believe that in the briefing I am going to be able to address the several issues that Senator Thurmond raised in his opening remarks.

So, with your permission, sir, I will proceed with the briefing.

Senator **Exon**. Certainly.

General **Chain**. You have asked for an analysis of our strategic situation vis-a-vis the Soviets.

What I'll Talk About

What's our task.
What the balance of forces is.
What our capabilities are.
What's the impact of start.
So what.

This is the outline that I am going to follow. I will first talk about what our tasks are. Then I am going to talk about the balance of forces by going through several scenarios, and then I'm going to talk specifically about the impact of the possible START agreement on our capabilities.

What's Our Task

Deter nuclear conflict.
If deterrence fails.
    [Deleted.]
    Limit damage to U.S. and its allies.
    Terminate conflict on terms that best protect U.S. interests.
Prevent or neutralize efforts to intimidate or coerce the U.S. or its allies.

I would just remind you, as you certainly well know, that deterrence is the number one mission of the U.S. military. Everything else is subordinate thereto. And if deterrence fails, we have to be able to do certain things.

One of the things we have to be able to do is, if the Soviets, for some unknown reason, were to start an attack on the United

States, we would want to have the capability of immediately having [deleted]. In other words, we would want to be able to hold at risk and be able to [deleted].

And so, we are very interested in [deleted] to their attack. By so doing, we would limit the damage that they could do to us and to our allies, and, obviously, we would want to terminate any conflict on terms favorable to us.

In the meantime, during peacetime, we also want to make sure that we have enough strength to prevent the Soviets from trying to coerce ourselves or any of our allies through the threat or use of nuclear weapons.

WHAT'S THE LOGIC TRAIN

FOR THE MILITARY REQUIREMENT

SOVIET MILITARY THREAT

POLICY: U.S. NATIONAL SECURITY OBJECTIVES

↓

GUIDANCE: U.S. DEFENSE POLICY

↓

DIRECTION: U.S. MILITARY STRATEGY

↓

THE MILITARY REQUIREMENT

There is a logic train to get to the forces that I am going to talk to you about.

Obviously, we start with a Soviet threat. You have been well briefed on that. You are all already very knowledgeable about that.

But, using that as a backdrop, the civilian leadership in the White House gives us a policy statement. It tells the military what they want us to be able to do.

This, then, is translated into defense guidance by the Secretary of Defense, which he provides to the Joint Chiefs.

The Joint Chiefs, in turn, give me specific military direction in the form of a capabilities direction. From that logic train, I come up with a military requirement that I need to carry out the things that the leadership has told me to be able to do.

WHAT THE THREAT CHANGES ARE

Soviet forces are getting better.
  Prompt, accurate offensive systems.
  Hardened facilities.
    Nuclear forces.
    Command control.
    Leadership.
  Mobility, dispersion and redundancy.
  Expanded strategic defenses.

Without going into a threat briefing, obviously you are well aware that the Soviets continue to change their force capabilities. They have continued to develop prompt and accurate offensive systems. They are hardening facilities, and they are making hard things that they cannot move.

In the nuclear forces, command, control and leadership the one we see a great deal of today is their emphasis on mobility. I believe this will become very clear as I go through the presentation. And, at the same time, they continue, as they always have done, on improving their defensive capabilities.

WHAT THEY BELIEVE

Soviet perceptions are shaped by:
  The overall military balance.
  U.S. capabilities to retaliate against specific target sets of high value to the Soviets.
    Their leadership—Communist Party control of the Soviet Union.
    Their source of power:
      Nuclear forces.
      Other forces.
    Their industrial and economic base.

Reading what the Soviets write, we see that they do also study the military balance and are influenced by the military balance, and they react to our capabilities to retaliate against them.

So, while we try to study them, we try to find out what is it that they hold most dear, and the things that we find are that they hold their leadership most dear, control of the Communist Party most dear; they hold nuclear forces very dear, other military forces dear, and also their industrial base, the war-supporting industries.

WHAT IT TAKES TO DETER

Ensure that no Soviet leader could ever believe they could gain from attacking the United States or its allies.

[Deleted.]

From that, we have been given a task, and our number one task of deterrence is to make sure that no military leader could ever go to the General Secretary of the Soviet Union and tell him that they have figured out a plan to be able to attack the United States with nuclear weapons, or our allies, and get away with it.

From that charter, the Joint Chiefs have given me [deleted] categories of targets that I need to be able to hold at risk. They have also given me [deleted].

So, I will be using these [deleted] as I go through today's presentation.

WHAT THE BALANCE OF FORCE IS

Now I would like to focus on what the balance of these forces are.

[Slide deleted.]

Today, we have [deleted] that we would like to be able to hold at risk in the Soviet Union.

Now [deleted] of those are [deleted] targets; [deleted] are [deleted] targets; over [deleted] are in [deleted] meaning [deleted] things like that; and then about [deleted].

So, as we go through and measure our capability against these target categories, you have to keep in mind the level of effort against each of those categories.

Senator THURMOND. General, before you change the chart, my recollection of your presentation last year is that there were more targets included in the assessment.

Is this the case? And what accounts for the decrease since last year?

General CHAIN. The target base is reviewed on an [deleted]. Some of the changes in the targets are, for instance the Soviets, taking down [deleted] and going mobile, that changes the number of targets in the equation. So these are not just a macro list. This is a specific list. And, as they change what they are doing, the target base will go up and down.

As you will see when we get to the START part of this presentation, this target number will go down [deleted] because of what the Soviets may do in the START arena.

Senator EXON. General Chain, I have just one question, if you could bring back the previous slide.

The one on the right I think you described as having to do with the [deleted]. Is that [deleted] or is that [deleted] or both?

General CHAIN. It [deleted] sir, in that it could be a [deleted] which would fit into that category and [deleted] that would end up [deleted] which would fit into that category. The other three categories are a lot clearer.

Senator EXON. In other words, if there is a last category, I presume it is that one, then?

General CHAIN. Yes, sir.

[Slide deleted.]

Again, I will remind you that the balance I am about to talk to is without START, and later in the presentation, I will be talking about what happens with START.

I will draw your attention to the bottom of the chart in that I am going to be using the years 1989, 1993, and 1997 throughout this presentation, so that we can have a flow, if you will; 1989 being where we are going to be, or where we are right now, this year; 1997 being in the probable time after a START agreement has been reached and been fully put into effect; and then 1993 just as sort of a benchmark, halfway in between.

Now, you will notice in the ICBMs, that the Soviets, in 1989, have the vicinity of [deleted]. The hatched marks mean the numbers that are mobile, and you can see between now and 1997, we see them [deleted].

The United States remains fairly constant. In [deleted] Peacekeepers in a rail garrison mode. By [deleted] Peacekeepers, and that would be the total part of our mobility force.

In the submarine launched ballistic missiles, you can see that the Soviets, having around [deleted] and that will become more clear as to why, as this briefing unfolds.

The United States ends up going up a little bit between now and 1993, as we field Trident submarines. But, between 1993 and 1997, we take out [deleted] submarines and come from [deleted] and at the same time add another four Trident submarines, for a net of [deleted].

You will see the impact of that later. But the warheads that are associated therewith will be showing up on the next chart.

Senator EXON. While I am looking at that, the U.S. blue on the right, in SLBMs, is that submarines or warheads?

General CHAIN. No. These are tubes. These are the missiles themselves, sir.

Senator EXON. The missiles themselves.

General CHAIN. In the next chart, I am going to show you the warheads on them.

So, these are the launchers that are going to be available. That is why the variation [indicating].

In the bombers, the Soviets remain fairly constant in that today they have Bisons and Bears, an early version of the Bear, which is a turboprop aircraft, and also a Bear-H. But, by 1997, we see a Blackjack, which is an aircraft that looks very much like a B-1 having come into production and then having in the vicinity of [deleted] and then rounding out their force with the Bear-H.

So, they are modernizing their bomber force.

In 1989, our bomber force, as you know, is made up of B-52 Gs and Hs, 99 B-1; but, by 1997, we will have B-52Hs, only in the nuclear role, the 99 B-1s, and by 1997, we are planning to have approximately [deleted] on the ramp. That is what is factored into this particular chart.

[Slide deleted.]

Now, in the warheads, which you just asked about, sir, you will recall the [deleted] but the [deleted] because they are going from the [deleted].

So, even though [deleted].

That is why they increased in the hatched marks and [deleted] [indicating].

Conversely, in the United States, our warheads available, with the Peacekeeper in the rail garrison and others, stay at this level [indicating]. The Soviet [deleted] and these lines [indicating] on our submarines reflect what I just talked to you about, our force structure.

Again, the aircraft, even though the aircraft numbers [deleted] their load-carrying capability does [deleted]. And, again, because of the B-2 coming in the inventory, plus the addition of the cruise missile, for us, our capability will increase by [deleted].

[Slide deleted.]

Putting this all together, strategic nuclear delivery vehicles on the Soviet side versus our side comes out like this [indicating], and in warheads, the Soviets today have a little over 10,000 warheads while today we have approximately 13,000 warheads.

By 1997, we see ourselves going up a little bit, but the Soviets being up over 14,000 warheads in 1997.

Again, no START.

I will draw your attention on this chart to two factors that I will talk about when I get to the START proposal.

There will be a limit of 1,600 SNDVs, so this part of the chart [indicating] will have to disappear under START, and on the warhead, we are talking about accountable weapons, and I will get into more detail there, at the 6,000 levels.

So these bars [indicating] would disappear in START.

I will cover that in more detail when we get there. But I just wanted to have that as a backdrop.

WHAT OUR CAPABILITIES ARE

Now, I would like to take that force balance and walk through several scenarios with you, possible attack scenarios by the Soviets.

What Our Capabilities Are

ATTACK SCENARIO GENERATED CASE (MOST LIKELY)

Global crises involving conventional war with U.S. and Soviets involved.
Prolonged tensions with fully generated forces.
Soviets initiate attack.
[Deleted.]

The first scenario that I want to walk through is the one that I consider the most likely, in that it is a generated scenario, meaning that both sides have brought their nuclear forces up to full posture; that we have a war going on somewhere in the world where Americans are killing Soviets and Soviets are killing Americans. Because of that, we have had prolonged tensions and we have generated our forces and they have generated their forces; and for some reason, unbeknownst to me, but for some reason, out of that posture the Soviets decide to launch an attack with nuclear weapons against the United States, and, obviously [deleted].

[Slide deleted.]

Now, as I walk through this chart, I will remind you that these [indicating] are the [deleted] target categories that I just talked about a few moments ago.

[Deleted.]

I am going to look at a baseline of 1983, 1985, 1993, and 1997, so you can see where we were, where we are, and where we are going because of the modernization program.

You should be very pleased with this chart because it says in 1983, I could only do [deleted] of what I was tasked to be able to do. In 1989, I am almost at [deleted] because of the strategic modernization program, with the ALCMs, with the B-1s, with the Peacekeepers and in the outyears, as we get the ACMs and the D-5s and the B-2s, I will continue to ramp up. [Deleted.]

And you can see the same story is true in each of the other categories.

This is a compliment to you.

Now, what if there had been other people sitting in this room, rather than you? Where would we have been and if they had not approved these programs?

Here [indicating] is where we would be, and I would be in here right now saying that I cannot do my job.

So, all this, above this black line [indicating], is what you have done through your modernization program. Our country would be in sorry shape if we did not have that program.

SECOND SCENARIO
BOLT-OUT-OF-THE-BLUE ATTACK
(MOST UNLIKELY)

- PRESUMES NO HEIGHTENED TENSION BETWEEN SUPERPOWERS
- PRESUMES THE SOVIETS WILLING TO BET THEIR COUNTRY THAT THEY CAN:
    - DISPERSE AND POSTURE WITHOUT DETECTION THEIR:
        - LEADERSHIP
        - MOBILE MISSILES
            - SS-24
            - SS-25
        - BOMBERS
        - TANKERS
        - SUBMARINES
        - SURFACE NAVIES
        - ARMIES
        - POPULATION
    - LAUNCH WITHOUT DETECTION
        - SLBM
        - SLCM
- VIEW U.S. RETALIATION WITH [DELETED] NUCLEAR WEAPONS AS ACCEPTABLE

Now I will take you to the next scenario, a "bolt out of the blue" in peacetime.

It is 2:30 now, so at a quarter to 3 today the Soviets attack without any warning, meaning there has been no heightened tension between the superpowers, and it presumes that the Soviets are willing to bet their country that they can do these things, that they can disperse their military forces, that they can protect their leadership, that they can move their mobile missiles out of garrisons, where we can't see them, that they load their bombers and disperse their bombers without us seeing them, that they disperse their tankers without us seeing them, that they take their submarines and send them out of their ports without us seeing them.

The Soviets have [deleted] nuclear submarines, boomers, those ICBM type or SLBM type of submarines. As of today, [deleted].

I would assume that they are going to attack us with nuclear weapons, so they might want to get those things out so that they don't lose them; that they would disperse their navies, their armies, and also their populations.

It also assumes that we are not going to detect an SLBM launch or a cruise missile launch.

The bottom line of all of this is that a Soviet leader would have to be willing and understand that in view of a "bolt out of the blue" attack, the United States would still be able to launch over [deleted] nuclear warheads back at them.

As you will see in a chart in a few minutes, I would still have another [deleted] warheads in reserve. So that means they would have to say I am willing to attack the United States and only get back [deleted] weapons in my face.

I think that would be a very strong decision for the General Secretary to make.

You can say well, suppose you don't launch all of those things promptly, General? Well, then, the answer is, including the reserves, I would be able to throw back at them over [deleted] nuclear weapons. I just don't think that a Soviet leader on a day-to-day case on a Friday afternoon would bet his country on such a scenario.

Although Unlikely

UNITED STATES MUST BE PREPARED

By having intelligence and warning systems essential for timely force posturing decisions.

[Deleted.]

A force structure which can deter a bolt-out-of-the-blue attack.

However, it could happen, and, therefore, we have to be prepared. We need to continue to put the money that you have put into intelligence and warning systems, we need that so that we could generate and be better prepared if we had the warning, and we have to make sure we continue to have a force structure that will provide adequate weapons, so that if it does come, a "bolt out of the blue," we present such a formidable offensive capability that it reverses the logic and it should never happen in the first place.

[Slide deleted.]

So, if such a thing should happen with our alert force this afternoon, here would be our capability against that.

Again, in 1989, we are pushing about the [deleted] level; but by [deleted] and, again, as you see on the chart, across the same [deleted] categories.

We do well in the [deleted] because of the [deleted].

Now I would like to talk about the Small ICBM and where does that fit into this equation.

[Slide deleted.]

The Small ICBM has great utility to us in that it is a survivable system in a tactical sense, in a tactical warning sense.

What we would probably want to do with the Small ICBM is [deleted].

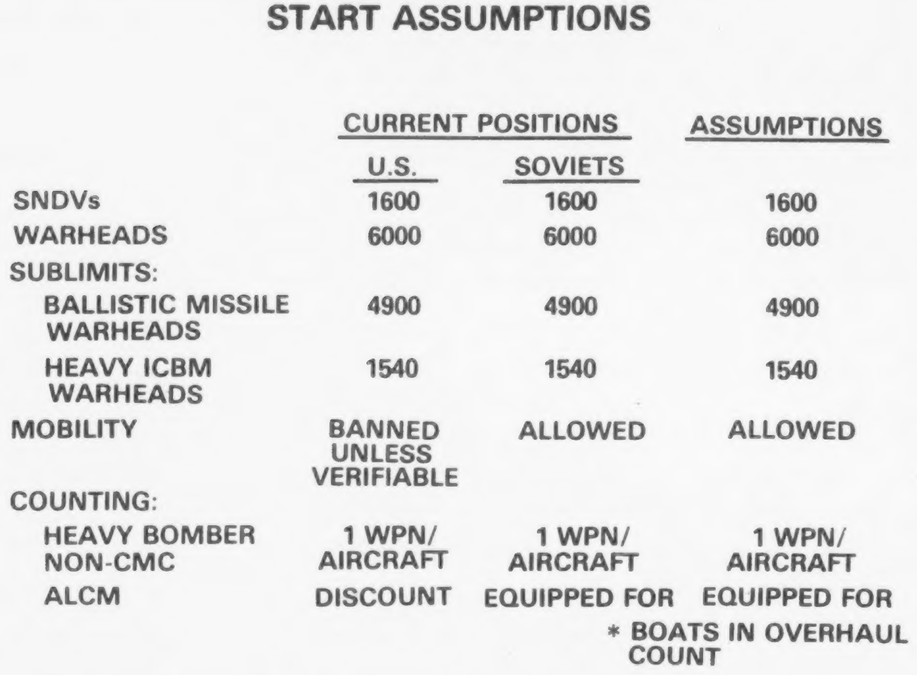
Now, in 1989, you can see how our strategic reserve forces are postured. We just have a [deleted]. The [deleted].

The same thing is true in the alert case: obviously, fewer numbers, but the impact is the same.

I get great utility out of the Small ICBM, [deleted].

WHAT'S THE IMPACT OF START

I would like to switch now to the impact of START.



START ASSUMPTIONS

	CURRENT POSITIONS		ASSUMPTIONS
	U.S.	SOVIETS	
SNDVs	1600	1600	1600
WARHEADS	6000	6000	6000
SUBLIMITS:			
BALLISTIC MISSILE WARHEADS	4900	4900	4900
HEAVY ICBM WARHEADS	1540	1540	1540
MOBILITY	BANNED UNLESS VERIFIABLE	ALLOWED	ALLOWED
COUNTING:			
HEAVY BOMBER NON-CMC	1 WPN/ AIRCRAFT	1 WPN/ AIRCRAFT	1 WPN/ AIRCRAFT
ALCM	DISCOUNT	EQUIPPED FOR	EQUIPPED FOR

* BOATS IN OVERHAUL COUNT

Senator EXON. This, General, is now the same scenario, but with START, with everything else being the same?

General CHAIN. I will explain that to you, sir.

The first thing I want to do, before I get into the START, is to explain to you that what I am about to say is based on lots of assumptions. I cannot verify any of them. I am talking about an agreement that does not exist, and I am talking about a timeframe that is 8 years from now. So there are a lot of assumptions.

I will tell you where I have the assumptions so that if someone wants to argue with me and say that something is not a good assumption, that is fine. We will do it another way.

But I will tell you what my assumptions are, and they are based on our intelligence briefing and what our projected force structure on our side is.

The current positions are as I mentioned earlier 1,600 SNDVs on each side; 6,000 warheads on each side—we have all agreed to that; 4,900 ballistic missile warheads, meaning a combination of ICBM warheads and SLBM warheads. This will become important to us in a few minutes, when I get into the briefing a little deeper.

We don't have any heavy ICBMs, so we are not worried about this. The Soviets do, with the SS-18, and this number is going to have an impact on them, how they end up fielding their force.

On mobility, the U.S. position today is to ban mobile missiles. The Soviets' is to allow mobile missiles.

I am going to assume for this briefing that they are allowed.

Counting rules: both sides have tried to figure out what are they going to do about the bomber and its load-carrying capability. Without getting down to the minutiae, unless somebody would like to, let me just simply say that both sides have agreed that the airplane itself, the bomber itself, is going to count as one warhead. Whatever is inside that bomber is not going to count.

Cruise missiles that are hung on the outside of the aircraft will each count as one additional warhead.

So, if I have a bomber with 12 cruise missiles, I have 13 counters. If I have a bomber with no cruise missiles, I have one warhead counter [deleted].

[Slide deleted.]

As I said earlier, we go down [deleted] in the number of targets. We go down from [deleted] and you can see a shift here [indicating] in that most of those come out of [deleted]. Where before we were [deleted] being nuclear targets, now we are [deleted] of the targets being nuclear because the Soviets will have to come out of their silos.

[Slide deleted.]

Now, you will recall some of the information on this chart from the previous discussion, because I am going to use 1989 as the baseline to show you the comparisons to the post-START in 1997.

In 1989, the Soviets will have approximately [deleted] and a portion of them will be mobile.

By 1997, however, we see their force being composed of [deleted]. That is what will compose their ICBM force.

Conversely, ours remains [deleted].

Their submarine launched ballistic missiles are going to have to come down, again, because of the counts; and ours, also, will have to come down, again, because of the count.

[Deleted.]

Their bomber force [deleted]. Our bomber force is what I briefed you before. But, again, I will point out in a few minutes [deleted].

[Slide deleted.]

This is warheads.

You will recall that both sides have to come down to 6,000 accountable warheads. So we see the Soviet ICBM coming down to match the force structure that I just showed you, and, again [deleted] of their warheads in the ICBMs will be from the mobile systems, the other from their [deleted].

Our warheads will be associated with a rail garrison in 1997. Again, their SLBM's will need to come down, and our submarine launched ballistic missiles will have to come down because the combination of the two cannot exceed the 4,900.

The bombers will [deleted] on both sides.

[Slide deleted.]

You will recall a few moments ago I emphasized the point that we have made an agreement with both sides that we can only have 4,900 warheads out of a combination of ICBMs and SLBMs. That is what the dotted line on this chart is [indicating], to show you that this is going to be a driving factor in the following force structure.

Here is where we are in 1989. The Soviets will have to come down from over 9,000 down to 4,900. We are going to have to come down from a little over 8,000 down to 4,900.

Now, let me show you how that happens.

The Soviets will, we predict, come down and bump right up against the line. We will come very close to the line by the following force structure.

We see the Soviets in the SNDV, the strategic nuclear delivery vehicles, coming down, even though they are allowed to have 1,600, we see them coming down below that, because of the number of warheads that they will end up on with their SS-24s, which, is 10 warheads. They are going to have [deleted].

We think they are going to have about [deleted].

Consequently, they cannot get up to the 1,600, or they would breach this line [indicating].

So, to stay within this line, they will have to be down below the 1,600 number.

[Deleted.]

So we think it will come out in this area.

The same thing is true with the United States.

Our force structure, when we bump up toward the 4,900, we are going to have to tailor this, so we will be [deleted].

Now, a very important part was back in Reykjavik. The Soviet, Akhromayev had a proposal that the weapons inside the bombers don't count. [Deleted.]

So, in this, as far as accountable weapons, we were going to run our bombers up to where we end up at the 6,000 accountable level, with the bombers and the SLBMs and the ICBMs [deleted].

So, this is very, very important to us. But we see that this is sort of the line-up of the force posture, primarily driven by this area [deleted].

[Slide deleted.]

I would like to walk you through what happens in a generated case.

A few minutes ago, I showed you what happened in a generated case, and we respond promptly.

These, you will recall, are the numbers. This is how well we do it in 1997, in a generated case, where the Soviets attack us, and we respond. And here is how well we do.

Now, in a START scenario, against what I just showed you, against that assumed force structure, here is how we come out.

Again, I point out the criteria that the Joint Chiefs have tasked us to be able to hold them at risk against, and here is how well we do.

The blue line shows how we will do if we don't continue with the modernization. The white shows how we will do with the modernization.

What I am going to tell you is [deleted]. We must continue the modernization.

[Slide deleted.]

Now, I would like to show you that same scenario day to day, prompt response, and compare the two.

You will recall, on the left, this is what I said we could to in 1997, without START, and on the right is what we can do. [Deleted.]

You end up getting some [deleted] and things like that.

But we do fairly well against those [deleted] categories, not so well against the [deleted]. But, even so, it is in the arena that we could be supportive, although I draw your attention to how much below the JCS criteria we would be.

START SUMMARY

- Mission unchanged by start agreement:
  - Target base [deleted]. But harder to hit.
  - Better weapons but fewer of them.
- START demands:
  - Strategic modernization.
  - Triad remains in relative balance.
  - Compliance by Soviets.

So, my bottom line, as far as a START agreement is concerned, is the target base goes down about [deleted] because, primarily, the land-based silos and their launch control facilities disappear.

We will have better weapons, but we are going to have fewer of them.

[Deleted.]

SO WHAT

- The Nation's Strategic Modernization Program:
  - Was and is needed.
  - Well conceived.
  - Is progressing well.
  - Is more necessary post-start than pre-start.
- You can take pride in its success to date.
- It requires your continued support.

So the bottom line of everything is that the strategic modernization program was certainly required. You all supported it, and it is working. And it is going to be even more important in a post-START environment than it would have been without a START environment.

That concludes my presentation, Mr. Chairman.

[The prepared statement of General Chain follows:]

STATEMENT OF: JOHN T. CHAIN, JR.
COMMANDER IN CHIEF, STRATEGIC AIR COMMAND
AND DIRECTOR, STRATEGIC TARGET PLANNING

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I welcome this opportunity to present my views on our national military strategy, how the Strategic Air Command supports the strategy, and two of the most important issues of 1988--fiscal reality and arms control. As it has been since 1946, SAC's primary mission is to deter war by providing a credible retaliatory nuclear force. To this end, as Commander in Chief of the Strategic Air Command, I am responsible for ensuring the constant readiness and combat capability of the ICBM and bomber legs of the strategic nuclear TRIAD. Additionally, our long-range bomber force assists theater commanders' in discouraging conventional conflict. Both nuclear and conventional missions are supported by a fleet of aerial tankers as well as airborne reconnaissance and command and control aircraft.

Finally, as the Director of Strategic Target Planning, I oversee the annual development of the integrated operational plan for the employment of our strategic arsenal and its coordination with theater nuclear plans. It is against this background that I offer my perspective on the strategic issues and opportunities now before us.

OUR NATIONAL MILITARY STRATEGY

As it has been throughout the post World War II period, the overriding objective of our national military strategy has been to deter--not fight--a war. To deter, we must have the capability to make the cost of conflict exceed any gain. Central to the concept of deterrence is the relationship between certainty and uncertainty. First we must convince a potential adversary of the certainty of our response to his attack. In turn, the certainty of this response makes him uncertain of accomplishing the objectives of his aggression. Thus, to complete the logic, to the degree we can increase the uncertainty of a successful attack--i.e., deny the fulfillment of war aims--the cause of deterrence is served.

When viewed from this perspective, it is apparent our strategic forces help deter many threats. First, the mere presence of our nuclear forces helps dissuade the Soviets from attempting political coercion or large-scale conventional conflict. In addition, by guaranteeing a response that is both certain and devastating, strategic systems deter nuclear war. Finally, however, should deterrent measures fail and conflict ensues, our objective becomes effective warfighting at any level--an objective that requires conventional and nuclear weapons in support of both tactical and strategic missions.

While this basic strategy of deterrence has remained essentially constant for over 40 years, it has matured to meet new demands. This evolution has been in response to alterations in the strategic environment and our fuller appreciation of what the Soviets truly value. In the years immediately following World War II, overwhelming U.S. nuclear superiority obscured the shortcomings of Massive Retaliation. As the Soviets gained a nuclear capability in the 1950s, however, many began to doubt the credibility of such an all-or-nothing doctrine. We came to realize that deterrence requires forces capable of fighting at any level of intensity in conflicts of varying duration. This evolution from Massive Retaliation to a more flexible posture naturally required a military force structure capable of responding to very limited threats as well as nuclear aggression. As Flexible Response became official policy in the early 60s, it quickly became apparent that existing nuclear forces were ill suited for anything short of cataclysmic employment. Further, the rapidly developing Soviet strategic arsenal called the survivability of our bomber force into question for the first time. Consequently, our strategic force structure suffered from the twin liabilities of declining credibility as a deterrent and doubtful survivability as a warfighting force. We clearly needed to change our way of doing business.

Certainly, we answered the call of the early 60s. Our nation's leaders recognized the adaptation of force structure to support national military strategy is, though long and costly, necessary to respond to threats to our survival as a free nation. Thus, the early and mid 60s witnessed the addition of new MINUTEMAN ICBMs and Polaris submarines to form a TRIAD of strategic systems. In the middle of the decade, a relatively stable balance of forces existed between the US and USSR. However, during the late 60s and throughout the 1970s, we failed to field modernized forces to match relentless Soviet deployments. Of the many reasons for this period of neglect, two stand out. First, as a nation the conflict in Southeast Asia made America weary of defense matters. Also, detente served to cloud the perceptions of most Americans by focusing attention on words rather than actions.

By the end of the 70s, however, a number of facts became apparent. First, Soviet strategic forces had become increasingly accurate, hardened, and dispersed. Further, initial development of mobile ICBMs promised sanctuary for a sizeable portion of their missile force. We also learned more about what the Soviet leadership values most--preservation of the Party apparatus, continuity of command and control, military forces, and post-war coercive capability. It was against this yardstick of vastly improved Soviet forces and a more complete understanding of what it takes to deter that our forces were measured in the late 70s and early 80s.

OUR TASK

The United States must field forces that can deter throughout the potential range of preconflict scenarios--from normal day-to-day conditions through the brink of nuclear war--yet will allow us to fight effectively if deterrence fails and nuclear war ensues. Day-to-day assured deterrence of surprise attack requires that we complicate Soviet attack planning with a variety of systems on alert deployed in multiple basing modes. Stability in a rapidly escalating crisis requires a balanced mix of day-to-day forces that can generate and/or disperse rapidly to increase total force survivability and the number of available weapons. Stability in a protracted or evolving crisis places a premium on forces that are survivable and enduring over a long period of time and create no incentive for use either through miscalculation or an act of desperation. If deterrence fails, our TRIAD forces must be flexible enough for the NCA to respond effectively at whatever level of conflict the Soviets initiate. After the Soviets have crossed the nuclear threshold, the capability for a prompt, large-scale retaliatory response as well as highly discriminate follow-on attacks against the full range of Soviet targets is required. Consequently, I am more than ever persuaded that a balanced, modernized strategic nuclear TRIAD (bombers, ICBMs, and SLBMs) is still the best means to compound the Soviets' attack problem, provide a variety of military responses, and safeguard against technological surprise. The mutually reinforcing nature of the TRIAD works and I see no reason to change it.

At the same time, we have the opportunity to bolster the nation's conventional capabilities to make nuclear war less likely. I'm particularly concerned that we fully exploit the potential of our manned bomber force. Theater commanders require a large, long-range, fully capable conventional bomber force to support their mission. Our strategic bombers are an essential element of their warfighting capability. When timeliness, range and payload are considered, there are conventional missions which cannot be accomplished and areas of the world which cannot be reached without SAC bombers.

ACCOMPLISHING THE TASK

Over the past several years, we have pursued a two-tiered approach to field the strategic combat capability we need to carry out national guidance. The first level of effort has been to leverage existing weapon systems through a series of cost-effective modifications. For example, our MINUTEMAN ICBMs are 40 percent more accurate than they were in the 70s. Further, modernization programs have greatly extended the expected service life of this proven weapon system. Likewise, B-52 modifications have upgraded avionics, improved accuracy threefold, increased survivability, and extended the life expectancy of the airframe. Additionally, the KC-135R program is producing a tanker with 50 percent more mission capability than the original KC-135A and will substantially increase overall aircraft performance. Finally, upgrades to our strategic reconnaissance force have increased our ability to provide users critical intelligence information in peacetime as well as during conflict.

We have pursued every reasonable avenue to squeeze all we can out of existing systems. These upgrades have increased capability at minimum cost; yet, they leave us short of the required capability to keep pace with the threat. To maintain a credible deterrent into the future, it is logical and necessary to develop and field new systems--systems to hold at risk increasingly hardened, mobile, dispersed, and well defended Soviet offensive nuclear forces. The ongoing strategic modernization program is the right approach and is indeed paying off. The B-1B and PEACEKEEPER are adding significant combat capability to the TRIAD right now. The remainder of the program is progressing well, but it is essential that we complete the program--even in this era of constrained military budgets and Glasnost.

Finally, we must remember it is not only weapon systems that ultimately deter conflict. The men and women in uniform have always been our greatest asset against aggression. Over the past several years, we have instituted many programs fostering greater initiative and creativity. These programs are allowing the bright ideas of our men and women in the field to more easily reach the headquarters. As a result, we are continually finding new ways to more efficiently accomplish the mission at higher levels of pride, morale, and professionalism.

PRESENT REALITIES: Fiscal Constraints and Arms Control

All that I have said to this point serves as my view of our national military strategy, the task to support the strategy, and the force structure plans we are pursuing to do our job. These plans represent the best military answer to the question of how to deter the Soviets. Today, however, we are facing a confluence of realities that greatly complicates the strategic environment. I would like to comment on just two of these realities--fiscal constraints and arms control.

Throughout this decade, the Strategic Air Command has received substantial support from the Administration and Congress. All three legs of the strategic TRIAD are now in the midst of modernization, and we are well on the way to correcting the strategic imbalance of the late 70s. It is increasingly apparent, however, that reduced budgetary expectations are leading to a new era in defense. In a few cases, we may be able to realize some savings through production line adjustments. In others, key programs will have to be cancelled. These choices will be difficult. These reductions carry a price of their own in the form of increased risk. The task becomes finding the least-risk option for each dollar saved.

A second area of planning uncertainty facing us in the immediate future is the prospect of an arms agreement that significantly reduces strategic offensive arms. An effectively verifiable accord that limits both sides to 6000 accountable warheads and 1600 delivery vehicles can lead to a more stable strategic balance if two conditions are met. First, that we maintain a balanced TRIAD. For the past 20 years the synergistic relationship between bombers, ICBMs, and SLBMs has deterred a nuclear attack against the United States. To abandon the TRIAD in the name of arms control would be folly. We must become more creative to exploit every ounce of capability from our TRIAD of forces. Second, that strategic modernization be continued. Modernization is essential in a START-constrained environment which places no limits on air defenses, anti-submarine warfare, hardening and burying efforts, and conventional forces. A START agreement is not a substitute for continuing modernization.

ACCEPTING RISK

The challenge before us is to find the right combination of strategic modernization and fiscal restraint--framed in the context of limits in a potential START agreement. Throughout this process, the guiding question must be "How much risk is acceptable?" In terms of nuclear systems, we must proceed cautiously--for the costs of our miscalculation could be catastrophic.

However, because of the severity of the fiscal reductions we have been forced to prioritize our required modernization of the ICBM force. I place the PEACEKEEPER ICBM as the first priority. With or without arms control, we need 100 PEACEKEEPERs to hold the most important Soviet targets at risk. The PEACEKEEPER's lethality, flexibility and prompt response are ideal for this task. Further, the application of 100 PEACEKEEPERs to the most difficult targeting categories allows the optimal use of the remainder of our TRIAD weapons.

We are fielding the first 50 PEACEKEEPERS in silos, and we are on track to complete that deployment this year. However, I believe mobility adds to stability and is essential for our land-based ballistic missile force as long as the Soviets refuse to agree to a ban on mobile ICBM systems. To this end, PEACEKEEPER Rail Garrison is the most militarily sound, cost effective, and least expensive system we can field. The second 50 PEACEKEEPER deployed in Rail Garrison will give us all the operational advantages of PEACEKEEPER plus enhanced survivability.

My second priority is the Small ICBM. Its military capability, flexibility, and survivability are very important for deterrence. However, it is very expensive. In the given funding environment--without relief from Congress--we cannot afford it.

Turning to the bomber force, I feel strongly about the B-1B bomber. We are now operating at all four B-1B bases and are scheduled to receive the final aircraft in May of this year. I have enormous confidence in the B-1B. It will be a superb warplane for the thirty-plus years of its operational life.

Also, B-2 development is proceeding at a prudent pace toward initial deployment in the early 1990s. This advanced design incorporates the latest advances in low observables, propulsion technology, and lightweight materials to ensure penetration capability and survivability. The special characteristics of the B-2 will enable it to defeat the most sophisticated Soviet defenses and attack all types of targets well into the next century. The B-2 is our most promising system against the relocatable target threat. I consider that to be tremendously important given the increasing mobility of Soviet forces. The B-2 design can accommodate improvements in sensors and avionics, ensuring its effectiveness and adaptability throughout a long operational life.

I also want to emphasize the importance of continued support for the MINUTEMAN and B-52. As I stated earlier, we have had great success in modifying both systems. Current and planned upgrades provide a great amount of capability for the dollar and deserve your continued support. I want to specifically address the ALCM B-52Gs. Retention of ALCM B-52Gs in the standoff role is required to maintain target coverage and ensure an orderly operational transition until the B-2 joins the Command in sufficient numbers.

Similarly, nuclear command and control modernization programs that support pre -and trans-SIOP functions are absolutely critical. Specifically, the Groundwave Emergency Network, Miniature Receive Terminals for bombers, and missile launch control center Super High Frequency Receivers are vital to survive and execute our strategic forces. Our emphasis must be on execution survivability rather than immortality.

One result of the INF Treaty is that deterrence of conventional conflict will become increasingly important. To that end, I strongly believe in dedicating the non-ALCM B-52Gs to the conventional mission. The airplanes are capable and constitute a bought and paid for national asset. SAC is fully committed to the conventional bomber mission. We are working hard to improve tactics, procedures, and training.

I strongly support continuing the KC-135R conversion program--it is integral to the success of both our nuclear and conventional missions. Given the current and projected tanker shortfall, to do less would impose unacceptable degradation on theater commanders' operations. Further, as intelligence remains a major force multiplier, I believe that reductions to SAC intelligence programs would involve too much risk.

Finally, I agree with Secretary Carlucci that lean, highly capable forces with motivated, committed people are preferred over larger, hollow units. Defense cuts must not be at the expense of readiness. Although flying hours are normally an inviting target, the impact of flying hour cuts on aircrew retention and readiness would be staggering--far more than mere training losses might suggest. Likewise, reductions in Operations and Maintenance funding would have dangerous impact on the infrastructure that supports our deterrent capability.

SAC AND THE FUTURE/CONCLUSION

We are now in a period of great turbulence in defense planning. During these times of change, however, certain factors remain constant. First, deterrence remains the best strategy to prevent conflict. Secondly, a credible deterrent will continue to require a fully modernized, balanced TRIAD--particularly in a START constrained environment. Third, we must be smart about the forces we put in the field. In addition to combat capability, our front line systems must possess the virtues of readiness and sustainability. Finally, we must continue to leverage our existing investment in B-52Gs where we can realize significant, low cost gains in conventional warfighting.

With continued Congressional support, I am confident the B-1B, B-2, PEACEKEEPER and D-5 will prove as successful in these areas as the B-52, MINUTEMAN and POSEIDON have over the past two decades. In sum, the Strategic Air Command remains committed to providing our nation the forces we need to fulfill our first and most basic security task--deterring nuclear war.

Senator EXON. General, thank you very much. We are going to recognize Senator Thurmond because he has to leave shortly.

Senator THURMOND. Thank you very much, Mr. Chairman. I appreciate your courtesy. I do have to leave in just a few minutes.

B–1B

General Chain, there has been some discussion coming from the House that we should limit future investment in the B–1B only to those improvements that would contribute to a stand-off cruise missile carrier capability.

What plans do you, as Commander in Chief of the Strategic Air Command, have for the utilization of the B–1 as a penetrating bomber, and how do you react to what could be viewed as legislating the mission for a strategic aircraft?

General CHAIN. I react with great concern. I am trying to be as polite as I can.

[Deleted.] It is just as simple as that. [Deleted.]

So I just cannot believe that anyone would want us to be in that position.

[Deleted.]

It is just not acceptable to try to even think of putting the [deleted].

Senator THURMOND. General Chain, how do you respond to critics who say that we have not gotten our money's worth from investments in strategic modernization since October, 1981?

Can you point to specific areas where we have gotten a strong return on investment?

General CHAIN. My first answer to the critics would be "bah."

I think with the briefing that I just gave you, the charts prove beyond a shadow of a doubt what our capabilities are and how they have been increased through the years because of the strategic modernization. Without the strategic modernization, I could not sit here today and tell you that I could do my job. In fact, it would be just the opposite.

START

Senator THURMOND. General Chain, are you being closely consulted on the formulation of our START negotiating positions?

General CHAIN. We have a good relationship with the Joint Chiefs. I get a weekly message, a personal message, of what has happened with all the negotiations the prior week.

I received a message just yesterday that we answered last night on a proposal that was coming up that was going to be addressed by the Joint Chiefs today.

I feel that my voice is being heard. It is being sought, but obviously only inside the military arena. And it should not be elsewhere. But I believe that the Joint Chiefs are consulting us fully.

TRIAD

Senator THURMOND. General Chain, some have suggested that the Triad synergism that you noted in your prepared testimony may be threatened in the future by more capable submarine launched missiles, that could simultaneously threaten bomber bases and ICBM silos.

Do you believe that this threat is likely?

If so, what are the implications for our planned force structure?

General CHAIN. I don't think that the threat is the "doomsday" threat that some people would have you believe. I think they have tried to take a threat that is a real threat and blow it totally out of proportion as to what effect it could have on the United States.

They talk about [deleted].

The old Yankee Is, which have been in their inventory since the early 1970s, have flight times down to [deleted] and up to [deleted] have been off our coast for a number of years, and it has only been within the last few months that they have not been off our coast.

When they come in close enough so that the time starts impacting on our forces, we have different postures that we can put the bombers in, and do put the bombers in.

So, any time the Soviets evolve and make their weapon systems better, that bothers me. But you can respond to Soviet evolving capabilities, one, by hardware; second, by tactics; and, third, by policy.

As far as the hardware is concerned, I believe that the bomber is a very survivable weapon, those that are on alert.

As far as tactics are concerned, we can always increase the number of bombers that are on alert. And, as far as policy is concerned, if the Soviets ever ended up with a submarine force that was holding our country at risk, then it would be in the political realm and not just the military realm because we can never allow our country to be in such a position.

B-2

Senator THURMOND. General Chain, comparisons of official statements last year and this year about the B-2 have led some to conclude that something must have transpired in the interim to make the system less capable.

Do you know why statements this year seem less enthusiastic about the B-2?

In your judgment, is there any basis in fact for being any less supportive of the B-2 this year than last year?

General CHAIN. No, sir.

I was supportive of the B-2 last year; I am equal, or even more, supportive this year.

[Deleted.]

Senator THURMOND. General Chain, I was very disappointed to see that the Air Force has [deleted] which this committee has supported strongly for several years.

Did you support this decision?

What are the implications of the decision, given the current and projected threat?

General CHAIN. [Deleted.]

I did not support the decision as we sat down to see what are all the things that we need to be able to do in the U.S. Air Force. But, once we had a financial limit, then things like that and a lot of other things that I feel strongly about ended up outside the funding line.

So, although I support it on the one hand, I understand the budget that has been submitted to you, and I support that budget on the other hand.

MINUTEMAN SICBM

Senator THURMOND. General Chain, some have suggested that improvements to the existing Minuteman force might be a more affordable alternative than the SICBM. How do you judge the cost effectiveness of improving the Minuteman force both with and without a START Treaty?

General CHAIN. We are going to have to do something about the Minuteman force. [Deleted.]

On the one hand, we can continue to try to upgrade and keep together the Minuteman, even though it will not have the same combat capability and flexibility as does the Small ICBM, and if money were no object, I would rather have Small ICBMs, than I would to continue to patch together the Minuteman.

But because money is an object, I need a hundred rail garrison Peacekeepers and I need the Minuteman to be as good a weapon system as we can possibly have.

If we can come up with the money, I would love to have the Small ICBM.

PEACEKEEPER MISSILE

Senator THURMOND. General Chain, Secretary Carlucci suggested to the committee that the first Peacekeeper missiles deployed in rail garrisons might come from Peacekeeper missiles already deployed in silos.

What is your opinion as the Commander in Chief of SAC?

General CHAIN. The Peacekeeper in a silo is very valuable to me. The Peacekeeper in a rail garrison is even more valuable to me and more valuable to the country.

If money is no object, I support all 100 Peacekeepers some day being on one rail garrison.

But my bottom line is that I need the 100 Peacekeepers and I would like to see us continue to field the first 50 in the silos, which will be completed by this fall, and get the second 50 in the rail garrison, which will improve our combat capability significantly.

SMALL ICBM

Senator THURMOND. General Chain, you mentioned in your prepared testimony that without relief from Congress, we cannot afford the Small ICBM.

What is the magnitude of the relief needed in order to make the Small ICBM affordable?

General CHAIN. We are talking about $40 billion over the next 5, 6, 7 years. We are talking a level of $5 billion a year.

I have no place to get that money.

KC–135 RE-ENGINING

Senator **Thurmond**. General Chain, what priority do you attach to restoring the rate of KC–135 re-engining that the Congress approved last year?

Would you invest your next available dollar in this program?

General **Chain**. Yes.

If I had one more dollar, I would put the one more dollar on the KC–135 re-engining. I think it is very important to our country, not from a Strategic Air Command point of view, but for the support particularly of the conventional forces. We need it to support the military airlift aircraft, the fighters, whether they be Air Force, Navy, or Marine Corps, and it is a very valuable program to us.

If I had another dollar, I would put it there.

SR–71

Senator **Thurmond**. General Chain, what is your assessment of the capability of the SR–71 program, as contained in the budget, to support your SIOP and related requirements?

General **Chain**. The SR–71 is a very valuable weapon system for this country. Unfortunately, with the budget reductions that we are staring in the face, it is also a very expensive program, and with great reluctance [deleted].

Senator **Thurmond**. General Chain, thank you very much. I am glad to see you again.

Keep up the good work.

General **Chain**. Thank you, sir. It is nice to be with you.

Senator **Thurmond**. I have another hearing and have to go, Mr. Chairman. I thank you very much.

Senator **Exon**. Thank you, Senator Thurmond. We understand that you have to go.

You have also helped us out by asking half of the questions that I had. So I thank you for that, too.

Senator Symms, I would be glad to go to you next. I will save my questions for last.

SOVIET ANTI-BALLISTIC SYSTEM

Senator **Symms**. General, in the scenario you lay out, do you take into consideration what happens in 1997 if, by then, the Soviets have deployed their anti-ballistic missile system and we don't know how satisfactory it will be, but let's say it could knock out 50 percent of our missiles?

Where are we then?

General **Chain**. The analysis, sir, did not take into consideration that at all.

[Deleted.]

What it would do is increase the value, obviously, of the manner bomber and the cruise missile.

Senator **Symms**. How about the civil defense expenditures which they have made? That is factored in, is that not correct?

General **Chain**. Factored in only in the fact that we do not hold their population as a target base. We feel that what they do through civil defense would be one of the key indicators of warning that they are going to attack the United States, and with the money they have put in the civil defense, one would logically assume they would try to alert their population and try to get them into safe havens.

But, that is not a target, so that does not have any influence on our attack plan.

ABM

Senator **Symms**. But back to that ABM question. The briefings that I have had on this were such that I would be amazed if they don't have an ABM system deployed by then.

You are, then, under the assumption or making the assumption that they won't have it?

General **Chain**. Because of the existing treaties, that they seem to be so vocal in keeping into effect and until the United States abrogates the treaty, I will just have to make the assumption from my current position that they are not going to have one.

Senator **Symms**. But that is highly risky, isn't it?

General **Chain**. No, I don't think it is highly risky because if they do build one, they certainly can't do it overnight.

SA-12

Senator **Symms**. Well, how about their SA-12s with nuclear warheads on them? Do you think there is a possibility they could knock down ICBMs?

General **Chain**. [Deleted.]

I saw that in the newspaper the other day, so I asked my intelligence people to get me a paper on that. I don't think this is an arena that I could brief you on. But I could have a person come in and tell you what we know about that, and I am convinced, after asking my intelligence people, [deleted].

Senator **Symms**. Thank you.

Thank you, Mr. Chairman.

Senator **Exon**. Thank you, Senator Symms.

General, I have a few questions, and we will have some questions for the record and some from possibly other members, as well as myself, and we would appreciate your responses to them.

PEACEKEEPER MISSILE

Let me ask you about the Peacekeepers. You said you would like to have 50 of the original scheduled in silos and 50 to go on the rail garrison.

Wouldn't your flexibility be greater if all of them were on rail garrison MXs?

General **Chain**. Yes, sir. I would love to have them all on there. Again, it is a matter of funding and priority.

But, eventually, I think it will be very good for the country to get them all in rail garrison.

Senator **Exon**. All in rail garrison?

General **Chain**. Yes, sir.

Senator **Exon**. But you feel that the best, the most expeditious way of handling this now would be to continue on your previously scheduled program of 50 in silos of 50 at least in the beginning, and then, if we reach that place, I suppose the 50 that are in silos could be taken out and put into a mobile fashion.

General CHAIN. Yes, sir, without much difficulty at all.

As you know, they are already in their own self-contained capsules. It is the type of missile that was built to be able to be moved around, and I don't think it would be very difficult.

SUBMARINE MISSILE FORCES

Senator EXON. Let me digress for just a moment into something that I know you know a great deal about and have a daily contact with, and that is our submarine missile forces around the world.

I have tried to hit this question in two or three different ways in our recent budget discussions this week with the Joint Chiefs and others, but we have not been in the right classification.

I was wondering what your reaction is and whether you have heard, or been briefed, to any extent, on the AKULA class submarine.

I have been getting some reports from some submariners, Navy people, that, [deleted] or, another way of stating it, [deleted] and one of the reports that I received was that [deleted]. As one Naval officer put it, [deleted].

What do you have to say about that?

General CHAIN. Sir, I would be really out of my league trying to talk about submarines and anti-submarine warfare.

I do know that our Government has seen fit to put a lot of money into anti-submarine warfare, which I applaud, in round numbers, [deleted] that I am aware of. I don't know if there is any black money, and I think that is very good because we need to make sure that we have a handle on the submarine fleet, on the Soviet submarine fleet, and we have a number of boats.

I also know that the Soviets have built and will have fielded by 1997, approximately, [deleted]. That worries me, and I am glad to see that we are continuing with our anti-submarine capabilities, because I don't want to see them have free reign to be able to hunt down our SSBN types of submarines.

So, I applaud our efforts in the anti-submarine warfare area.

Senator EXON. I hear what you are saying.

A main concern of mine has always been—and I assume a main concern of yours also—that they would develop some attack boats that would be a serious threat to our boomers out there, which would, you know, let them know where to be able to find them a little closer in, and be in a position to strike them in case of an outbreak of war, where a scenario could develop.

Maybe another way of putting this is that the good news that I am hearing from the submarine front is the Soviets don't seem to be anyhere near the threat that I read about in "Red October."

General CHAIN. Yes.

Senator EXON. I think that is generally good news, is it not?

General CHAIN. I agree with you, Senator, in that the presentation I gave, we were talking about [deleted].

So I'm talking about putting [deleted] in each one of those boats. So I want to make darn sure that no Soviets out there are tracking down those boats and could make an attack before a preemptive, other type of attack on the United States. That is one of the reasons I am a strong believer in the Triad.

I think each leg of the Triad has strengths and each leg of the Triad has its weaknesses; that by having the Triad and a strong, balanced Triad, then we offset the strengths and weaknesses of the other.

Senator EXON. It's kind of tough to be a SAC Commander without a Triad, wouldn't it be?

General CHAIN. It would be impossible.

STRATEGIC DEFENSES

Senator EXON. General, recently General Herres testified before us on the requirements established for strategic defenses.

It seems that the requirement was based upon creating uncertainty in the minds of the Soviet planners about the success of a decapitating attack under "bolt out of the blue" conditions.

I have a number of questions in this regard and about this requirement.

First, were you consulted about this requirement? If so, do the final requirements essentially reflect your own input?

General CHAIN. No, and no.

Senator EXON. No, and no?

General CHAIN. But I can give you my opinion.

Senator EXON. Well, I should hope you would.

General CHAIN. I think having a Phase I of an SDI would certainly add doubt to the Soviets, and anything we do, either offensively or defensively that adds doubt ends up helping me in my primary mission, and that is to deter a nuclear war, not to fight a nuclear war.

As your recall from my presentation, if the Soviets should hit us this afternoon, "bolt out to the blue," we would throw back at them [deleted]. I think that that is a pretty good deterrent thought in and of itself.

If, added to that, we had a limited SDI, so that their initial attack was erode closing some of their weapons coming in, that could be added to that deterrent factor. But I think our strength in today's world is by having an offensive force strong enough so that they would not conceive attacking in the first place.

I am not anti-SDI, by the way.

Senator EXON. You are what?

General CHAIN. I am not against the SDI. I think the SDI makes a lot of sense. But I would not crank that into a requirement for our day-to-day posture. There are other things that I could do if I thought we needed to improve our posture, such as increasing the number of aircraft that are on alert and sending more submarines out to sea.

So, if I thought we needed to be in a stronger defense posture for some reason, particularly when we get the rail garrison, which is not threatening at all, by moving it out onto the railroads—because that adds to stability.

It does not increase my offensive capability at all. But, what it does do is it decreases their offensive capability.

SUPPORT OF SDI

Senator **Exon**. Then, while you said that you support SDI, as I think most of us do to one extent or another, is it fair to say that you don't think that SDI could be substantially justified on the basis of the "bolt out of the blue" scenario?

General **Chain**. That's true, sir.

Senator **Exon**. Third, if the aim is to create uncertainty, would you agree that we have to weigh carefully the costs of effectiveness of alternative methods of creating uncertainty?

Defenses are one way, and mobility and concealment are another; redundancy is a third; and so on.

Is that thinking that I just outlined pretty much the thinking of the Commander of SAC?

General **Chain**. Absolutely, and we spend many hours a week doing that type of arithmetic. What can I do with the forces that I have and what do I need tomorrow to be able to do my job better? All of those elements that you have mentioned go into those equations.

SDI PHASE I

Senator **Exon**. We have had a lot of discussion here and a lot of input during our series of hearings on SDI, and we have come back to the SDI Phase I proposition that we hear so much about. I am not sure that we have gotten a full handle on that yet.

But SDI Phase I was not mentioned on your list of priorities. Where does SDI Phase I rank as far as the SAC Commander is concerned?

General **Chain**. Right after every one of those items that I have in the budget today.

Senator **Exon**. All of the above, then?

General **Chain**. Right after "all of the above."

Senator **Exon**. I'm not going to get into the SDI thing anymore with you because I am not sure that I am totally comfortable with it, and I am not sure that it would be particularly helpful today.

What about this.

SUPPORT OF START

Although you did not say so, I took it, from the scenarios that you outlined, that you were generally in support of the START proposal, as it has been advanced as of now? As you discussed it, I assume that you are in support of it.

General **Chain**. In a macro sense, I am in support of how it appears to me as the way it is going to unfold.

Senator **Exon**. In saying that, though, General, I also take it that if we don't keep up our modernization that you emphasized pretty much today, the START proposal might not be in the long-range interests of the United States.

Isn't modernization the key to maintaining at least our present position with regard to deterrence of the Soviet Union—modernization?

General **Chain**. Without modernization, I will come before your committee and vote no on START.

Senator EXON. We have heard repeatedly that under START, the Soviet Union warhead to target ratio is going to get much worse than it already is, plus that of our SLBM's, which would be dangerously concentrated.

I did not get that picture from what you presented to us today. What are your comments on that?

General CHAIN. I believe in the force structure that I envision in a post-START environment, we will have a balanced Triad. [Deleted.]

Senator EXON. Do you have any further questions, Senator Symms?

Senator SYMMS. Yes, just one more question, Mr. Chairman, if I could.

B-1

General, one of the decisions that was made at the Secretary level that has bothered me greatly is the fact that we went through all of the trouble to develop and build a B-1 and then only built 100 bombers.

In your personal opinion, wouldn't it have made a lot of sense to have built that second 100 for $150 million apiece?

General CHAIN. Yes.

I like the B-1. I have flown it four times. It is a great aircraft.

B-2

But, again, given budget considerations, I understand fully why they stopped at 100, because we need the B-2.

I think the B-2 is to conventional aircraft what the jet engine was to a propellor driven engine. I think it is going to revolutionize our capability in the manned bomber area.

Senator SYMMS. So you think the mix will be maybe not that important, whether we have 100 B-1s, they will have to at least defend against it, and if we have the others, a mix will still throw them off-guard?

General CHAIN. Yes, sir.

I think the mix will be very healthy. [Deleted.] The B-2 obviously has some unique capabilities that no other aircraft is going to have.

I think a combination of the two is going to present a formidable problem to the Soviet Union.

AIRCRAFT CARRIERS

Senator SYMMS. Well, I guess the problem that bothers me is we are fighting over how many aircraft carriers to build and the cost that goes into that. When you see how many bombs you can haul on a B-1, you wonder which is the most efficient way to do it.

If we have to decide our budget not based on the threat, which I disagree with, but based on the budget, which is really what you are saying in your testimony here, we are basing our military deterrent and preparedness based on dollars and not on what the threat is.

General CHAIN. This is the first time, perhaps, in the history of the military that we have come over here with a cap that has been agreed upon by an administration and by a Congress on financial limits, and we are here not under duress, by any stretch of the imagination, but knowing that we have to be very positive in our priorities and very judicious and careful in our priorities to stay within the bounds of the budget. This is because we have been told there is not going to be any more money.

I would love to be sitting here and telling you that I would love another 100 B–1s, because I would. I would love to be able to replace the B–52s.

I am going to be using B-52s out through the turn of the century. But I would rather have B–1s. I would be much more comfortable with my crews in it.

I would like to have more than 132 B–2s. I think our country is going to need it.

The manned bomber in a post-START environment is a very, very valuable asset to us. But when you give me a financial constraint, and when I have to do things like take [deleted] then I am past the fat and the muscle; I am into the bone. I cannot come here and tell you that I need things that I know won't come to pass.

Senator SYMMS. Thank you very much.

Mr. Chairman, I would like to say that this certainly bothers me.

I have talked to the potential new Secretary of the Navy this morning and made the same observation to him. We are literally cutting into the muscle and bone of our defense preparedness now.

General CHAIN. Yes, sir. Absolutely.

Senator SYMMS. You mentioned about flight crews and flight time.

SAC RETENTION RATE

How is your SAC retention rate of the skilled level pilots, weapons officers and so forth, that you have to take so long to train to get them to where they are really capable of being an aircraft commander, or in like positions on those airplanes.

What is your retention level?

General CHAIN. It stinks.

Do you want me to repeat that for you?

Really, it is a sad day for our country. I think that there are several reasons for this.

I had breakfast the other morning with the House Armed Services Committee and I told them that I think we have a crisis of confidence in the military today. People came in and they wanted to be warriors, and they would like to have this as a way of life. But, since 1982, we have seen our pay erode to where it is now 11 percent below what the rest of the civilian comparable level is.

The pilots have seen their flight pay raised in 1982 back to where it should have been, and it was allowed to erode with not any increase since 1982, so it is significantly below the 11 percent degradation.

They see an airline offering to hire them, to pay them $100,000, or $150,000 a year, which is certainly twice as much as a four star general makes, with a lot less hours, no alert commitment. So there is a draw on the outside and yet they want to be a warrior.

But when they see the pay erode, when they see money coming out of morale, recreation and welfare funds, they see that the Congress does not care and that Congress is reflecting the views of the American people, and the American people don't care.

So, why the hell should they continue to wear a uniform and put up with the stuff they have to put up with if people don't care?

So I have a problem out there with these young pilots. I have to go out and talk to them. I have to tell them that they do care: it is just not reflected in your pay and it is not reflected in the MWR funds, and it is not reflected in money for housing, and it is not reflected in flying time, and trust me; I will go and testify and tell the people on the Hill that they had better be more supportive of you or you are going to walk on them.

If they walk on us, we are going to have to write a check for about $4.5 million per pilot to bring them in and train them, and then wait about 7 years until they have the experience of the pilot who walked out had.

So, it is a loss leader as far as money, and here we have the best force that this military has ever seen, and they are teetering on the brink of absolute abandonment.

In SAC, the B–52, the bomber pilots are staying in at a current rate of about 58 percent. The tankers are down in the 30s. The Military Airlift Command is down to 29 percent.

I don't know where we are going to get those replacements.

Senator SYMMS. Are these captains and majors?

General CHAIN. Yes, sir, captains and majors—right at the heart of capability, if you will—not off in staffs, or anything, but in the cockpits.

It is a problem that is very significant now, and now we have to come, hat in hand, and ask you to help us, to buy our way out of it.

I detest the idea of having to go to a bonus. But, on the other hand, it looks like it is the only straw we can hang on to to try to keep these good people. And what a rotten way to do it. Rather than taking care of them as warriors, we are now going to try to buy them off. I just think that is terrible.

Senator SYMMS. I hope you say that wherever you go.

General CHAIN. I say it everywhere I go and to every civilian group that I get up and stand in front of.

Senator SYMMS. I totally agree with what you are saying and I am very disappointed, frankly, in what has happened in the last 2 years with the budget.

May I ask one other question, Mr. Chairman?

Senator EXON. Sure.

Senator SYMMS. This probably is not a strategic question, but at any time during this recent invasion into Honduras, which we had ever reason to expect would come since around the first of the month, was [deleted].

General CHAIN. [Deleted] each year we have a Commander-in-Chiefs Conference, and last summer, in the Commander-in-Chiefs Conference [deleted] with the Joint Chiefs of Staff and all the theater CINCs. [Deleted].

The Joint Chiefs know that. Admiral Crowe knows that. And so, they did not have to call up and say are you ready. They know full well that we are ready, and everytime I'm with the Chiefs, I remind them that SAC is not just a nuclear command. We are a conventional command with an awesome amount of combat capability in the conventional arena.

Senator **SYMMS**. Well, my own opinion is that it was one of the biggest missed opportunities in history, when we had them invading and knew it was going to happen. We should have shot all of those helicopters down in Honduras and bombed their military targets and had this thing over with.

I think the American people would support it, and then your warriors would certainly have their morale back up.

General **CHAIN**. I hear what you are saying, Senator.

Senator **SYMMS**. Thank you very much, Mr. Chairman.

Senator **EXON**. Well, I go along with this line of discussion, but I am not sure I go along with the last one.

But you are certainly entitled to your opinion, Senator.

Senator **SYMMS**. I have been saying that outside this room, anyway, Mr. Chairman. It is no secret.

BONUSES

Senator **EXON**. General, I was interested in your reaction to bonuses. I believe that when we went to bonuses several years ago for Navy pilots, carrier pilot's particularly, it helped a great deal. Of course, it was during that time when we had lots of money and we recognized the problem. I also serve on the Manpower Subcommittee, and I am aware of the difficult situations that we have now. In some of my direct contacts with your pilots and other personnel I have heard comments about the 2 percent salary increase, and I know that is a morale factor.

Is that loss of manpower primarily in pilots, or does that go on down to the navigators and crews in general? Or is it primarily with pilots that you are having this difficulty?

General **CHAIN**. It is primarily pilots, Senator.

Obviously, that does spin off to the other members of the crew. But the problem that we have today is the pilots. If we had had through the years adequate flying time so that they felt that they could hone their combat skills to the level of their potential, and if we had been keeping their salary at an even keel, I would not even be in here talking to you about a bonus because we would have never been losing them in the first place.

PILOT RETENTION

Senator **EXON**. Have you had the same difficulty holding pilots in the Air Force as the Navy, or pretty much the same?

General **CHAIN**. I can't go into detail, sir, but I understand that that is true.

Senator **EXON**. How do we solve this problem? Obviously, with the budget constraints that we all know we have—and I thought that the Secretary of Defense, and I suspect with the council and advice of people like yourself agreed that even if we have to cut forces, you know, it is better to cut forces and have a good force than to have a group of people that we are not sure we can count on fully.

If we are losing primarily pilots, then that obviously is an immediate concern, and I am not sure how we can solve that. You see, that is why bonuses have generally been acceptable, because it is a bonus being paid to a certain skill that you need, and pilots are certainly a skill, and by paying bonuses, you get away from having massive costs by generally raising the pay levels of all ranks. That is where you get into this big proposition.

Has there ever been consideration in the Air Force or Navy of possibly having a different pay scale—you can call that a bonus, if you want to? In other words, if you have a major that is a navigator and you have a major that is a pilot, and the pilot is the one we are losing, then we would give consideration to a higher pay grade for a major who is a pilot? Is that a possibility?

General CHAIN. That is exactly what you are about to do, sir, with the bonus. You are about to separate the pilot out from the rest of the corps.

Senator EXON. And you don't like that, do you?

General CHAIN. I don't like it. What I would really like to see is a person comes into the military, knowing they are never going to be rich. But they know what the salary is. But then, after a few years they see it erode, no one told them that, they would come in and watch their salary erode. You come in and get flying pay because it is hazardous duty pay, and then you see that erode. You see that by the time you get to be a general officer, they slap a pay cap on you, and all four, three, and two star generals make the same amount of money. So you really want to aspire to get to the top of the corporation because then you can be in a Communist society, where everybody gets paid the same.

Small things sort of all add together to say maybe this isn't such a good deal. Maybe being a warrior and serving my country is a nice idea and I'd like to be able to do it, but maybe I don't want to do it.

I would like to see the flying time stop being a level of conversation. I think the crews deserve to have enough flying time to be combat capable, and that ought to be one of the first checks that is written.

I think that the basic pay ought to be indexed so that as inflation goes up, by god, the military does not have to come over here, hat in hand, and say please, Mr. Senator, would you just give us a little token pay raise because the troops need it. It ought to be taken care of, and that ought to be automatic.

If we had things like that, I don't think I would be over here now telling you that we had any pilot problem.

Senator SYMMS. General, how long will it be if you have pilot problems that the navigators will want to get out and say they don't want to ride with the inexperienced pilots?

General CHAIN. Anything I answer to that would be speculation. I would hope they would have confidence in the guy who is at the controls. But there will be a spinoff. The same thing is true with the young men on the flight line, the men and women who work on these aircraft.

Senator EXON. General, I think that that is a problem that we had better start addressing.

We have your advice and that of others on that.

AIRLINE PILOT SHORTAGE

Over in the Commerce Committee yesterday, we were talking about this over in the Aviation Subcommittee. We are hearing from responsible officials that are telling us that there is a critical—critical—shortage today of airline pilots, and there is going to be an even more critical shortage in the future.

General Chain. Yes.

Senator Exon. Well, if that is the case, then that means that your problem is likely to get worse, instead of better, in the future, because if there is a shortage of pilots, they are going to be certainly bidding up the salary scales to get them, and the best source of pilots is right out of your school.

General Chain. That's exactly right, sir.

This country has a problem.

Senator Exon. General, you have been, as usual, to the point and forthcoming. We appreciate it.

We will have some other questions to submit to you for the record. We have some from some of the members of our committee who are over at another meeting on the INF Treaty this afternoon.

We will submit these to you in writing.

Is there anything that you would care to say now in summation?

[The Air Force did not return the questions for the record with answers in time for printing.]

General Chain. Sir, it is a great privilege to be here. I think time is our most valuable resource, and for you to give us your time to listen to what is on our minds is appreciated, not only by me, but by all of the members of the Strategic Air Command, who know that I am up here telling you what is on their minds.

Senator Exon. General, you do an outstanding job out there, and we appreciate the sacrifices that you and your men and women make.

Keep in close touch, as you always have.

With that, we are adjourned.

[Whereupon, at 3:35 p.m., the subcommittee adjourned, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

TUESDAY, MARCH 22, 1988

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES
AND NUCLEAR DETERRENCE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

ABM SYSTEMS COMPLIANT WITH THE ABM TREATY

The subcommittee met, pursuant to notice, at 9:34 a.m., in room SR-222, Russell Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Levin, Warner, Thurmond, Quayle, and Wilson.

Staff present: Andrew S. Effron, counsel; Robert G. Bell, Robert F. Bott, Brian D. Dailey, Sherri Wasserman Goodman, William E. Hoehn, Jr., and T. Kirk McConnell, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Gregory J. Weaver, assistant to Senator Levin; Donald A. Mitchell, assistant to Senator Glenn; Terrence M. Lynch, assistant to Senator Shelby; William J. Wight, assistant to Senator Warner; Henry D. Sokolski, assistant to Senator Quayle; Mark J. Albrecht, assistant to Senator Wilson.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. The subcommittee will come to order. Senator Wilson has joined us. Senator Strom Thurmond will be here in just a few moments and he will have an opening statement.

The committee meets this morning for its second hearing on the Strategic Defense Initiative. We had hoped, indeed we had planned to hold our second SDI hearing yesterday. That hearing would have featured General Abrahamson and Under Secretary Costello testifying on the fiscal year 1989 SDI budget request and on ABM Treaty compliance issues. We had to postpone that hearing due to Secretary Costello's unavailability. I don't know when we can reschedule that hearing but I can assure all that we will hold that hearing prior to mark up.

The postponement of General Abrahamson and Secretary Costello's appearance is unfortunate. It also affected our plans for this hearing. It has been our practice to bring in outside experts to advise us on program plans and compliance issues after hearing from the Department of Defense. When we were unable to have that hearing as planned we had to change course rather rapidly.

On the positive side, this change in plans affords the committee an opportunity to examine the important issue of what could be accomplished with the deployment of a strategic defense system which complies with the ABM Treaty or which would require only modest amendments thereto. This question is being discussed in earnest both here on the Hill and in the larger analytical community. We also understand that DOD has a formal study that is now under way.

The problem is that the results of this administration's study won't be available for quite some time and it could well be that the committee would not be able to hear testimony until some time next year, which we think is most unfortunate and certainly unsatisfactory.

Accordingly we have asked two of the major contractors who have done some analysis on this issue to brief us on their results. These briefings do not, of course, reflect an authoritative administration view, but they should be quite useful in beginning to acquaint our members with the nature and the range of possible costs and consequences of such an initiative.

The industry representatives we have with us today are from Lockheed Missiles and Space and McDonnell-Douglas Astronautics Co. From Lockheed we have William Loomis and Kenneth Fisher. From McDonnell-Douglas we have Dean Hofferth. These witnesses will form our first panel and I welcome each of you gentlemen and thank you for coming.

The second panel will be Dr. Anne Cahn, the Director of the Committee for National Security. Dr. Cahn will not be responding directly to the technical issues raised in the first panel's presentation, I want to stress that. Rather, Dr. Cahn will be providing a more general critique on the concept of defending against limited attack threats.

I want to thank all the witnesses for coming here today. We are particularly grateful that you all have been willing to come on such very short notice. Our plan this morning is to open with McDonnell-Douglas followed by Lockheed. Each will have 20 minutes for presentation, after which we will have a question and answer period. Then subsequently we will hear from Dr. Cahn as I have indicated.

I would call on Senator Wilson at this time if he has any opening statements or comments.

Senator WILSON. Thank you very much, Mr. Chairman. I do not have a formal opening statement. I commend the Chair for holding the hearing. I agree that it was a wise thing to reschedule it at the earliest possible date and I am grateful to you for doing so.

I think there is a necessity to hear from those who are actively engaged in providing us with the potential components of a first phase system and I think I will not take more of the committee's time than to thank the witnesses and the Chair for their presence this morning, and the Chair for inviting them here as early as possible after we had to reschedule.

Senator **Exon**. Thank you very much, Senator Wilson. I believe then we will get started with Mr. Hofferth, and I am pleased to welcome you and ask you to proceed at this time.

STATEMENT OF DEAN D. HOFFERTH, DIRECTOR OF THE HIGH ENDOATMOSPHERIC INTERCEPTOR PROGRAM, McDONNELL-DOUGLAS ASTRONAUTICS CO.

Mr. **Hofferth**. Thank you very much, sir. I am pleased to be here. Mr. Chairman and distinguished members of the committee, on behalf of the McDonnell-Douglas Astronautics Co. I welcome this opportunity to contribute to your timely examination of the technical feasibility of the accidental launch protection system that was suggested by Senator Sam Nunn on the 19th of January. And I applaud the efforts of this distinguished subcommittee to explore the prospects of a near term defense against a few missiles that might be launched by accident.

With this, sir, I would ask your permission to stand and address the viewgraph screen and talk to viewgraphs which I have prepared.

Senator **Exon**. Fine. Will it be ncessary to dim the lights?

Mr. **Hofferth**. I will let you be the judge of that. I think the screen is bright enough so that you can read it.

Senator **Exon**. I believe it is all right.

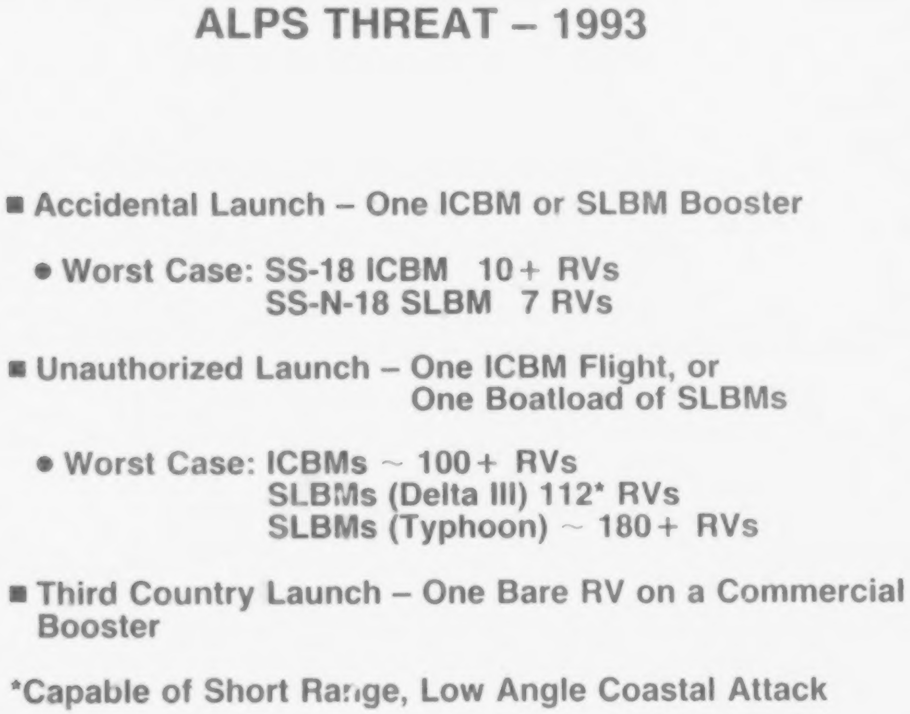
ALPS MISSION

- **Safeguard against accidental and unauthorized ballistic missile launches toward CONUS**
- **ALPS deployment and the 1972 ABM treaty: ". . . defense deployments might be possible within the terms of the ABM treaty, or at most, require a modest amendment." S. Nunn**
- **Provide high probability of destroying all incoming RVs**
- **Provide ALPS at low cost with existing or currently planned SDI elements**

Mr. **Hofferth**. As you stated, Senator Nunn really set the tone for the briefing that we are here to talk about today in his speech on the 19th of January and he really defined the mission for the accidental launch protection system where he said that we ought to be able to provide a defense, perhaps have to have a minor modification of the treaty that would protect us against accidental and unauthorized launch.

We have expanded that mission definition to say that it ought to have high probability of destroying all of the RVs that are coming in either of those two cases. And let me later on express that in terms of leakage where we can define it as the number of reentry vehicles that get through.

We have suggested also, of course, that we need to be attentive to cost and that we ought to think in terms of using the elements that are being developed by the SDI system.



ALPS THREAT – 1993

- Accidental Launch – One ICBM or SLBM Booster
  - Worst Case: SS-18 ICBM 10+ RVs
    SS-N-18 SLBM 7 RVs
- Unauthorized Launch – One ICBM Flight, or
  One Boatload of SLBMs
  - Worst Case: ICBMs ~ 100+ RVs
    SLBMs (Delta III) 112* RVs
    SLBMs (Typhoon) ~ 180+ RVs
- Third Country Launch – One Bare RV on a Commercial Booster

*Capable of Short Range, Low Angle Coastal Attack

Now in order to have a complete understanding of ALPS and in order to be able to define an architecture to satisfy the mission that we have defined for ALPS we need to look at the threat. And in the case of the accidental launch we have said that that is one booster load of RVs. It is one ICBM or one SLBM.

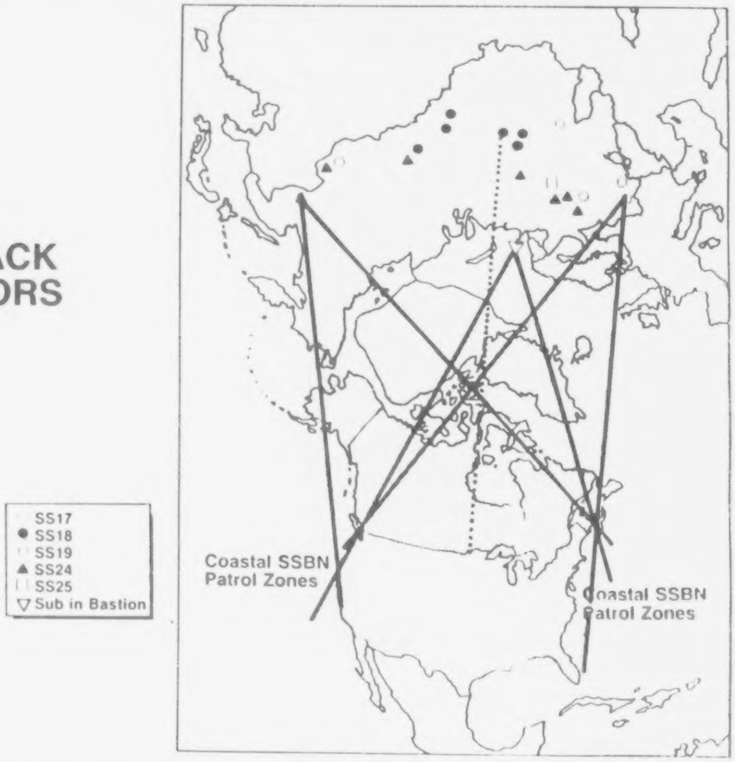
So in this case you are looking at a relatively limited number of reentry vehicles, 10-plus in the case of the ICBM and 7 in the case of the SLBM as a maximum.

Now for an unauthorized launch, let us define that as a flight of ICBMs, in which case the maximum would be on the order of 100-plus RVs, and for the SLBM a boatload.

So it now becomes a question of what submarine you are talking about, whether it is a Yankee, and we know that those are being pulled back into areas near the homeland, the Delta class boats which are still operating to some extent in the broad ocean area, and then the Typhoons which are just coming on line with their new SS-N-20, so any one of those representing a boat load and the maximum number of RVs in their particular class.

We have addressed also third country launches and I am not sure it is fair to talk about them in terms of being sent in as a booster load. It may be that the greater possibility there is that they will come in in the hold of a freighter or some such thing.

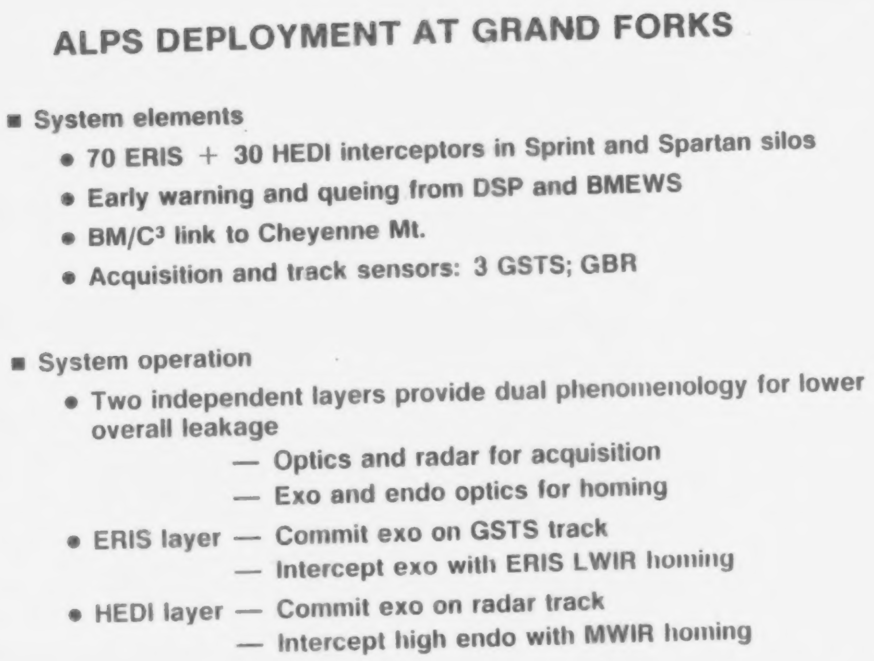
ATTACK CORRIDORS



Here, just for information purposes, I have shown the approach corridors for the ICBM, and you know that the Russians have their ICBM launchers spread across the breadth of their country. So we have simply shown two triangles here, one on the east and one on the west of Russia to encompass the breadth of those launch facilities coming into the United States.

And then you see the middle triangle with its apex up above Norway and Sweden where the Typhoon boats are generally being considered to be located. They are in what has been called Bastion. And you see that launches from those Typhoon boats will look very much like ICBMs coming over the pole.

So we simply show that triangle as covering the breadth of the United States. And then you know also that the sea-based, that is the submarines, are operating out in the broad ocean areas in the Pacific and the Atlantic, and in some cases get in within 1,000 miles or so of our coastline.



ALPS DEPLOYMENT AT GRAND FORKS

- System elements
  - 70 ERIS + 30 HEDI interceptors in Sprint and Spartan silos
  - Early warning and queing from DSP and BMEWS
  - BM/C^3 link to Cheyenne Mt.
  - Acquisition and track sensors: 3 GSTS; GBR

- System operation
  - Two independent layers provide dual phenomenology for lower overall leakage
    - — Optics and radar for acquisition
    - — Exo and endo optics for homing
  - ERIS layer — Commit exo on GSTS track
    - — Intercept exo with ERIS LWIR homing
  - HEDI layer — Commit exo on radar track
    - — Intercept high endo with MWIR homing

Now we have presumed for purposes of our work a desire to have 70 ERIS——

Senator EXON. Could I interrupt you for just a moment for the opening statement by Senator Thurmond who has to leave shortly for a meeting with the President?

Senator Thurmond.

Senator THURMOND. Thank you very much, Mr. Chairman. To save time I will just ask unanimous consent that my statement appear in the record at this point, because I have got to leave.

Senator EXON. Without objection.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT OF SENATOR STROM THURMOND

Thank you, Mr. Chairman. I join you in welcoming our two panels before the subcommittee this morning. The first panel should afford an interesting perspective on the technological possibilities for early deployment of a limited strategic defense capability, while the second promises a policy oriented perspective.

I would note, Mr. Chairman, that we have not yet had the benefit of General Abrahamson's assessment of refocusing the near term SDI program toward an Accidental Launch Protection System such as was described by Senator Nunn. This overall program perspective is a necessary one, given that the effectiveness of a strategic defense system, however limited in scope, will depend on a system of systems. This morning, we will be hearing only about the weapons end of such a system of systems.

Mr. Chairman, I would also like to hold out the possibility of hearing from other outside witnesses on the SDI program, should that appear warranted after we hear from General Abrahamson on the details of the fiscal year 1989 request.

Finally, Mr. Chairman, I would note that the presentations by Mr. Hofferth and Mr. Loomis, and their expertise, is primarily technical in nature, and we should refrain from asking these gentlemen to engage in a policy oriented discussion.

Thank you, Mr. Chairman.

Senator THURMOND. If I can get back I will, and I will also have some questions for the record. I am glad to have you gentlemen with us.

Senator EXON. Senator Thurmond, thank you. Please proceed.

Mr. HOFFERTH. So we would suggest then that for an ALPS deployment there is sufficient or certainly technical rationale to have both an exoatmospheric and an endoatmospheric interceptor subsystem involved in that. And the exo, as you know, is the ERIS built by Lockheed. And the HEDI is the endoatmospheric interceptor developed by McDonnell-Douglas.

We are suggesting 70 ERIS and 30 HEDI. And you are aware, of course, that there are 70 Sprint and 30 Spartan silos already in existence at Grand Forks. So the investment costs for those facilities that would be required has already been made. We would certainly use the early warning and cueing system relative to the defense satellite program and the ballistic missile early warning radars that are located across the top of Alaska.

And for the purposes of this system we would suggest tying in the battle management and command communication and control to Cheyenne Mountain. We already have existing facilities there and in a sense we would only have one site in this case. We would simply expand that facility rather than build new facilities at Grand Forks.

And then, in order to complement the interceptor set, we suggest using a ground-based sensor tracking system, GSTS, and the ground-based radar as the acquisition and tracking sensors for the deployment of Grand Forks. By doing this we end up with two layers of defense and you are familiar with the fact that SDI is already architected as a layered system. Here we gain the advantage of dual phenomenology, exo and endo operations, and I will talk a little bit more about that.

TWO LAYERS, DUAL PHENOMENOLOGY INCREASE EFFECTIVENESS

	Probability of Each RV Penetrating Defense (Percent)
■ One layer of defense	
- One acquisition sensor	
One shot, exo or endo	14
Two exo shots	6
■ Two layers of defense	
- Two acquisition sensors	
Two exo shots	4
One exo, and one endo shot	2
Two exo, and one endo shot	0.8

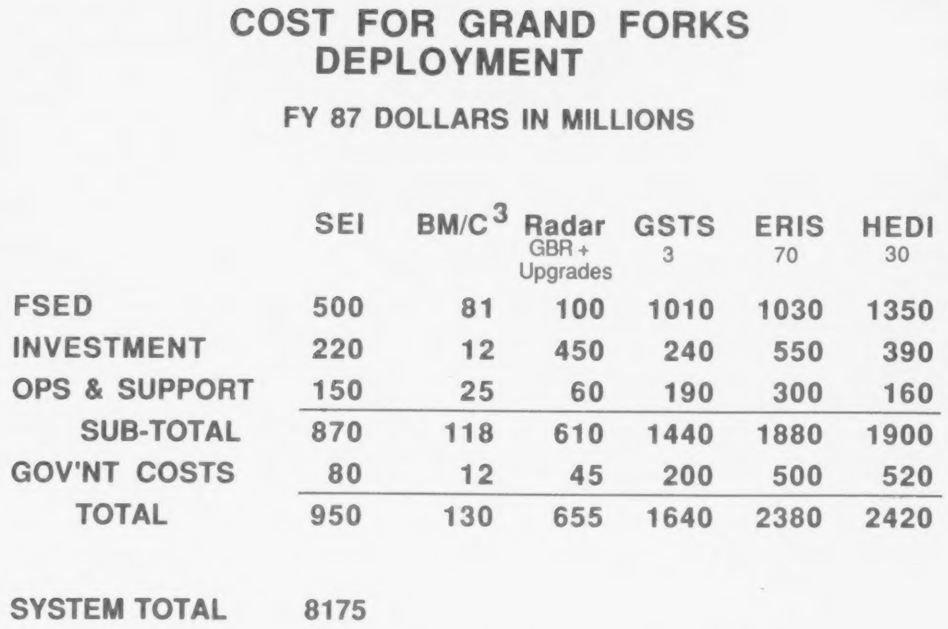
(Assumes interceptor homing leakage is systematic, i.e., not independent from shot to shot for the same interceptor type)

I said I would come back to leakage and here we have gone through the calculations to determine the leakage that we would have if we had just a single sensor, say a GSTS or ground-based radar, and a single interceptor, either ERIS or HEDI, but only one of each of those. And with one shot of an interceptor we would have a leakage of 14 percent, or out of 100 RVs, 14 would get through to the target.

If we take two shots with that single-layered system we could reach about 6 percent. By going to the two-layer system, by having both exo-GSTS, LWIR acquisition system, long wave infrared acquisition system, and the ground-based radar operating at one of the radar frequencies, and here we have costed out an X-band radar, and by shooting two shots of one of the interceptors, not both yet, we can reduce the leakage to 4 percent.

But by getting to both acquisition systems and both interceptors, the HEDI and the ERIS, we can reduce that leakage to 2 percent, so that only 2 out of 100 would get through. And by shooting two exo interceptors and one HEDI interceptor you could get to less than 1 percent.

So now you have gotten to the point where your leakage is less than 1 reentry vehicle out of 100 getting into the continental U.S.



COST FOR GRAND FORKS DEPLOYMENT

FY 87 DOLLARS IN MILLIONS

	SEI	BM/C^3	Radar	GSTS	ERIS	HEDI
			GBR + Upgrades	3	70	30
FSED	500	81	100	1010	1030	1350
INVESTMENT	220	12	450	240	550	390
OPS & SUPPORT	150	25	60	190	300	160
SUB-TOTAL	870	118	610	1440	1880	1900
GOV'NT COSTS	80	12	45	200	500	520
TOTAL	950	130	655	1640	2380	2420

SYSTEM TOTAL 8175

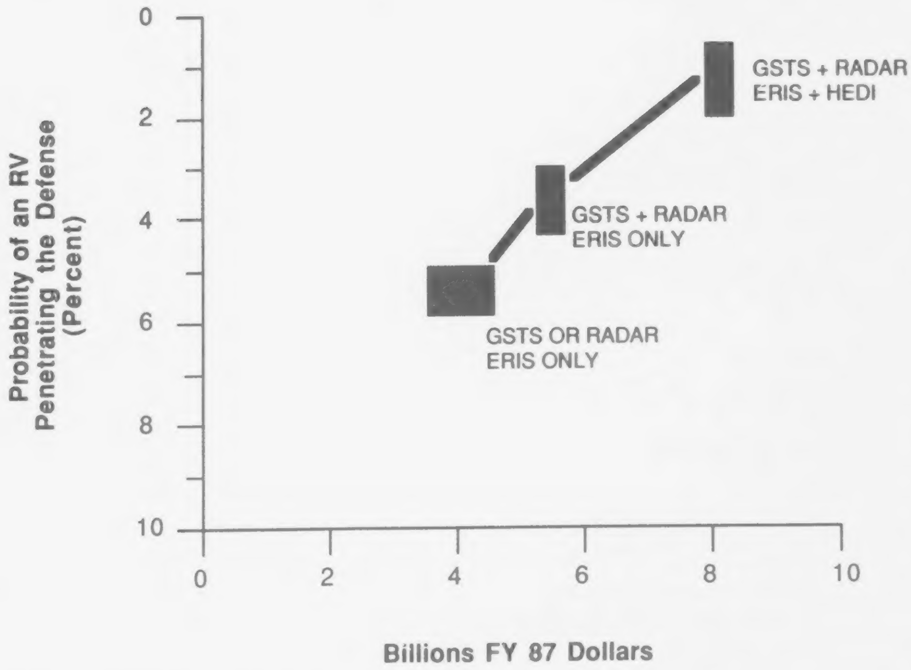
We have presumed also to cost out these systems, and you know that McDonnell-Douglas has been involved in ballistic missile defense activities for about 30 years. Over that course of time we have developed what we call cost estimating relationships where we have a set of data that we can draw a curve through to use for estimating the cost of various elements of the system. We do that not only for missiles of course but for aircraft and other things as well.

Now this approach to costing is generally considered to be accurate to within about 20 percent. On that basis, we have costed out HEDI, the GSTS or ground sensor tracking system, the battle management C^3, and the system engineering and integration. We are presuming that there would need to be a contractor to tie all of these elements together.

The costs that you see for ERIS—and you will hear more from Mr. Loomis on that—are costs that we obtained some time ago from Lockheed. The radar costs are costs that we obtained from Raytheon. The composite of all that data suggest that the system as I have outlined it here would cost on the order of $8 billion to put in the field. And if you look at the 20 percent error that is associated with this approach it might be as high as $10 billion to put such a system in the field.

ALPS CONFIGURATIONS COST EFFECTIVENESS

TWO LAYER SYSTEM INCREASES PERFORMANCE



Now I built a chart here to compare this leakage that I talked about with respect to cost, and you can see that if I go with a single system, the ERIS or HEDI, the GSTS or the ground-based radar, I can achieve a leakage of about 5 percent at a value of about $4 billion or $5 billion.

And if indeed low leakage is the mission requirement for this ALPS system then we would suggest that you need the two layers. It will cost you additional money in order to get to that 1 percent or less leakage level, on the order of $8 billion.

Senator EXON. How many?

Mr. HOFFERTH. $8 billion to $10 billion.

Senator EXON. $8 billion to $10 billion. Compared to what you used a moment ago, is that the same $8 billion to $10 billion?

Mr. HOFFERTH. Yes, sir. So all I have done is compare leakage here with the cost of the system so I can build one component of that system, one layer of that system, for $4 billion for a leakage of 4 to 5 percent. I can build the total system for a leakage of less than 1 percent for about $8 billion to $10 billion.

Senator EXON. So for about double the cost you can give us what you anticipated would be 99 percent kill?

Mr. HOFFERTH. Or better.

Senator **Wilson**. 99 percent or better against what threat?

Mr. **Hofferth**. Well, let us see. The statistics are independent of the threat. But obviously if you only have 100 interceptors you can only handle so many reentry vehicles before you exhaust the interceptor systems. So if you have to go—for example, to get this leakage, if you have to shoot two ERISs and one HEDI you will exhaust the system after 33 or so reentry vehicles.

For an accidental launch that is not a problem. But I would suggest that for an unauthorized launch, if you will agree with that definition, you cannot defend against an unauthorized with a treaty-limited system because you only have 100 interceptors.

Senator **Exon**. If I understand what you are saying, in lay terms we think of an accidental launch as possibly one vehicle with 8 to 12 warheads. Somehow through accident—which is hard to imagine but accidents do happen—this system would handle it. But if we had one of the Soviet boomers whose skipper got total disinformation and launches several, we have got problems?

Mr. **Hofferth**. Yes, sir. And I think that is a distinction that you all and we will certainly have to address as we look to this ALPS system, because there is a treaty-limited ALPS and then there is a full-up ALPS, if you include the unauthorized launch as part of that definition.

Senator **Wilson**. Mr. Chairman, I think that is a critical point. I think you are right to hit on that as early in the presentation as you have. Could I just at this stage ask, this that you are presenting to us is treaty-constrained? That is why there is 100?

Mr. **Hofferth**. Yes, sir.

Senator **Wilson**. What would be the full-up?

Mr. **Hofferth**. That is in the next part of my briefing. I have considered an add-on that would be outside of the treaty.

Senator **Wilson**. Let me just ask you this question. You say that the 100 version is treaty-constrained. I would raise a question though, Mr. Chairman, as to whether or not even with 100 this might not be in violation of article I of the treaty in terms of the prohibition against a nationwide system. And I think what you have said indicates that it is clearly a nationwide system.

Mr. **Hofferth**. I want to be careful here, and I am not trying to shy away from your comment because your comment certainly is appropriate. What we are talking about is a defense that is larger than the offensive fields at Grand Forks, which was the original intention of the treaty. But let me say also that a treaty-limited system at Grand Forks cannot defend the whole United States against the array of threats. So I am agreeing on the one hand with your statement, but also adding.

Senator **Wilson**. So if we are talking about a system that would be truly treaty-restrained, requiring 100 and requiring that it not be a nationwide system, we are talking about something less than what Senator Nunn was talking about?

Mr. **Hofferth**. Yes, sir. See, it is a system of elements that would have less capability than we have in the ERIS and HEDI and GSTS and GBR.

Senator **Wilson**. Because it might deal with accidental, a minor threat. It might deal with Qaddafi. But it would not deal with that sub captain that the chairman is worried about, the Soviet sub captain who could unwittingly rise to the authorized and unauthorized launch.

Senator EXON. If I understand this, and I am struggling with it, and that is why again I thank you for coming over today, I would like to have Mr. Bell of our staff comment because he has been following this very closely.

As I understand it, to get down to that 1 percent or less leakage we would have to launch three interceptors. We would have to shoot three interceptors to get to the less than 1 percent leak. If so, and if you had 100 coming in, that would mean we would have to have 300 interceptors going out, which I believe is the limit—I believe the limit under the treaty is 100, so the treaty would have to be amended.

I would certainly only remind all that this basically has been talked about for some time, highlighted by Senator Nunn's remarks in January. So what we are here doing is to see, to get the best information that the subcommittee can for the full committee to make some determinations with regard to what is practical, what the costs will be.

Mr. Bell, would you like to comment on this, anything that you have on this that might clarify this first sticking point we have run into?

Mr. BELL. Mr. Chairman, the only point I would make is that Senator Wilson raised the question of whether an ERIS deployment at Grant Forks that would be capable of striking reentry vehicles coming in against any part of our country would be a violation of article I of the ABM Treaty, which prohibits the deployment of a territorial defense or the preparation of a base for such a defense. This is certainly a very valid question and one that has been raised in many quarters in the public debate that followed Senator Nunn's speech in January.

The research I have done on this issue indicates that when the ABM Treaty was negotiated the two sides deliberately and expressly rejected the idea of putting a range limitation on the interceptors that could be deployed legally under the treaty, either at Grand Forks or at Moscow.

So if we put in a system at Grand Forks that is not range-limited and that is capable of intercepting a missile that was coming in at San Diego, for example, that would not, at least under my reading of the treaty and the negotiating record, be construed as a violation of article I, because the two sides expressly intended not to limit the range of the interceptors that could be deployed at the authorized sites.

Senator WILSON. Then what is the significance of the nationwide or territory-wide prohibition? It seemed to me that that had to do with the footprint, and not the range and whether you can hit it 5 feet off the ground here or 5 feet over the ground over the Soviet Union. I do not think that was really covered. I think what they were really talking about was having a system that would in fact give you protection over the total footprint of your target.

Mr. BELL. I think, Senator, as is often the case in treaties, the first article of the treaty is intended to make a basic statement of the objective of the treaty. And the basic objective of the ABM Treaty is to prohibit a territorial defense of either side. But the treaty was not intended to prohibit ABMs; in fact the treaty goes on to expressly permit limited deployments at one site.

So the question becomes, if you have a deployment at that site and the two sides have expressly rejected the notion of a range limitation, would a deployment of an interceptor of great range contravene article I?

I can just say my personal reading of that is that the answer is no. Plus, we also have to remember that when the ABM Treaty was signed the treaty permitted two deployment sites. In our case we could have had one at Grand Forks and one at Washington. So if you carried the logic too far you would, under this theory that has been expressed, and it is certainly a valid question, have to look at the two-site option. You would then have to ask yourself how tightly constrained would the range of an interceptor have to be if you are allowed to have them at Grand Forks and at Washington without getting full national coverage. That would close that footprint even more.

Senator Exon. Full national coverage. This system would not cover Hawaii and Alaska.

Senator Wilson. It would cover the continental United States.

Senator Exon. I do not think we should spend a great deal of time on this, although it is an interesting point. I guess most would suspect that if we could develop a system like this that was designed for an accidental one-launch attack or an unauthorized boomer attack, I would assume that with the attitudes coming out of the Soviet Union today that it might be a relatively easy proposition to get them to agree on something of this nature.

Because let us remember that accidental or error-prone launches, it would protect the Soviet Union also, because if we can stop them before they come in on an accidental basis it heightens the likelihood that we are not going to be making a response against the Soviet Union. And so I think that is a positive thing that we have to look at here. Any further questions or shall we go ahead?

Senator Wilson. Not a question; just a comment, Mr. Chairman. I think you are making not only a valid point but a very important point. And I think that what we are going to be concerned with, as your questions have indicated, is that the response that we develop toward accidental or, as you have termed it, the greater threat, the unauthorized launch, be viewed not just in terms of the treaty.

And I have raised the treaty constraints, but what I am concerned with is that they have been constrained by the treaty. I think we ought to know as well what would be an adequate response to an unauthorized launch, constrained by the treaty or not. And I think that if we have not done that we really ought to have them do that.

Mr. Hofferth. As I suggested, I will go on from here to talk about the unconstrained treaty presentation.

Senator Wilson. Mr. Chairman, I am sorry. I have got to leave. I will be back. I have to go to the floor.

Senator Exon. I would point out to all this is an open session, so this is not highly secret stuff. We are not trying to hide the fact from the Soviets that we are concerned about this. I suspect that we do not put ourselves in their shoes often enough too.

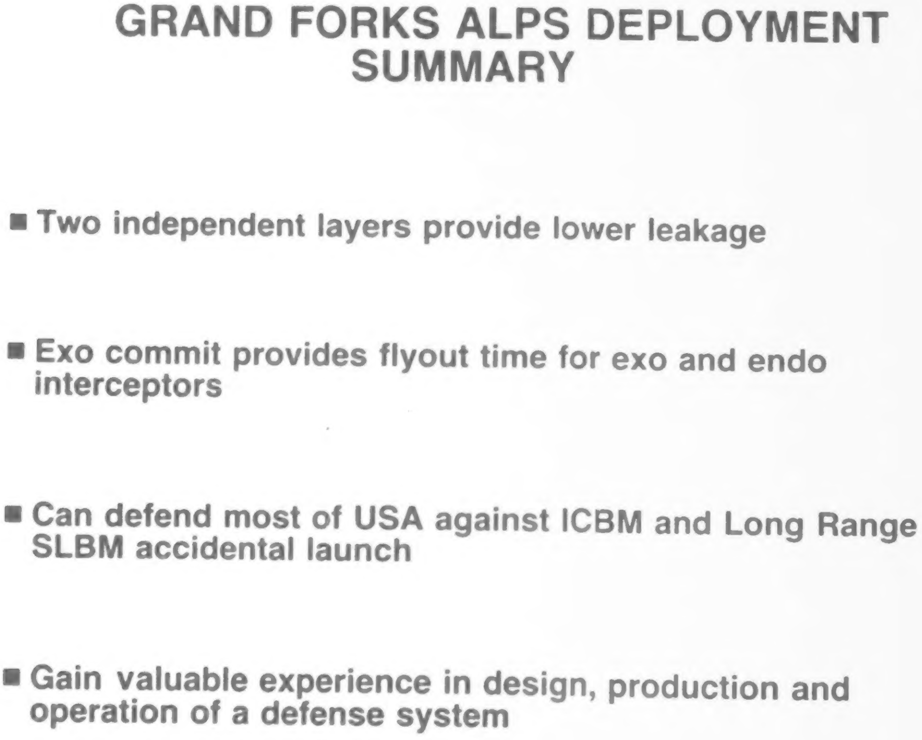
I suspect that the Soviet planners must be sitting over there wondering if we would have a General Ripper somewhere along the line that would start something. So I would think that they may be as interested as we may be in some kind of protection.

So the fact that we are holding this in open session today indicates that we are trying to approach this from the standpoint of not only what would be good for the United States but good for the Soviets and the entire world. And I suspect the Soviets are also concerned about what we have not talked about much in the past, but as you have mentioned earlier, the Third World threat of a Qaddafi or someone like that, which is not as impossible or implausible I suspect at some time in the future than one might think today.

Please continue with your presentation.

Mr. **Hofferth**. I will summarize here, but let me just go back and say that what I have been talking about is a treaty-limited deployment at Grand Forks. And certainly the question that Senator Wilson raises is one that will have to be debated out. But it is treaty-limited; it will address the accidental launch very nicely as long as it is ICBM in nature.

We will have trouble covering the SLBM areas—that is, the coastal areas—and that is what I will talk about next because when you get to the unauthorized case we are talking about a flight of ICBMs or a boat load of SLBMs. You need more than 100 interceptors.



GRAND FORKS ALPS DEPLOYMENT SUMMARY

- Two independent layers provide lower leakage
- Exo commit provides flyout time for exo and endo interceptors
- Can defend most of USA against ICBM and Long Range SLBM accidental launch
- Gain valuable experience in design, production and operation of a defense system

So as I said, I have been talking about treaty-limited, two independent layers to provide this lower leakage that I talked about. We would use exo commit for both the exo interceptor and the endo interceptor because we are talking about flying out long distances.

So we have to develop a track on the reentry vehicle and commit the interceptor in some cases 400 or 500 seconds before the actual intercept is made. And we could with that system defend against the ICBM and the long range SLBMs, those things coming over the pole.

And certainly by having all of these elements deployed at Grand Forks a system that would contain the same elements as the Russians have in their Moscow facility would provide for us an opportunity for design maturity, production experience and operational experience with the system. So with that then, let me go on.

Senator QUAYLE. May I ask a question, Mr. Chairman? How many missiles are you assuming in an accidental launch?

Mr. HOFFERTH. Approximately 10. Ten to 14 or 15. It is a single booster-load.

Senator QUAYLE. One booster and 10 or 15 warheads?

Mr. HOFFERTH. Right.

Senator QUAYLE. And if you had more than that it would be difficult?

Mr. HOFFERTH. We could certainly, you know, use our interceptors to do what we could against the larger launch of a flight of ICBMs or an SLBM Typhoon boatload, for example.

Senator QUAYLE. But just one missile?

Mr. HOFFERTH. One boat.

Senator QUAYLE. One ballistic missile and up to about 14 warheads?

Mr. HOFFERTH. For accidental. We define "unauthorized" as a flight of ICBMs, which would be 100 approximately.

Senator QUAYLE. 100 warheads or missiles?

Mr. HOFFERTH. Reentry vehicles.

Senator QUAYLE. So it would be 10 ballistic missiles and about 100 warheads?

Mr. HOFFERTH. Right.

Senator QUAYLE. And you can defend against that?

Mr. HOFFERTH. No, sir.

Senator QUAYLE. That is the next phase. And how many would you have to have in the next phase to defend against that?

Mr. HOFFERTH. Well, let me go on and I will talk about that.

EXPANDED COASTAL DEPLOYMENT FOR ALPS

Mission:

- Defend highly populated coastal regions, NCA and other critical targets against accidental SLBM launch at short range

- Provides additional defense and lower leakage against accidental ICBM and Long Range SLBM launch

Additional system elements:

- HEDI at five coastal sites
  - Inventory required per site to defend against Delta boat load ~ 120 – 140

- Radar (GBR) acquisition and track
  - 1 per site

- GSTS optional
  - 3 on each coast

- BM/C^3 with capability for attack/response assessment

So now when you talk beyond the Grand Forks deployment and think of the footprint, the part of the United States that can be covered from Grand Forks, what happens is you end up, in the case of the SLBM in particular, concerned about the coastal areas, because it is a long reach from Grand Forks out to the coastal areas, either the east or west coast or even the southern coast.

And you are well aware, of course, that a tremendous amount of our national assets exist in a band of about 300 miles depth from the coast. And I will quantify that a little bit for you in the next viewgraph.

To the extent that we deploy on the coast for purposes of SLBM, if we deploy more interceptors, more acquisition systems, those assets, we can also bring to bear against the ICBM and a long-range SLBM.

So all we are talking about here—and so far in what I will tell you in the presentation—is about HEDI. That is all we have looked at so far in our study. But we believe that there is a more cost-effective combination of ERIS and HEDI that could be deployed at the coast and we will be looking at that over the next several weeks.

Senator QUAYLE. Is the mission just accidental SLBM launch?

Mr. HOFFERTH. It is unauthorized.

Senator QUAYLE. It does not say unauthorized.

Mr. HOFFERTH. It certainly should; sorry about that.

Senator **Quayle**. You may want to make sure it is in that slide.

Mr. **Hofferth**. We will fix that.

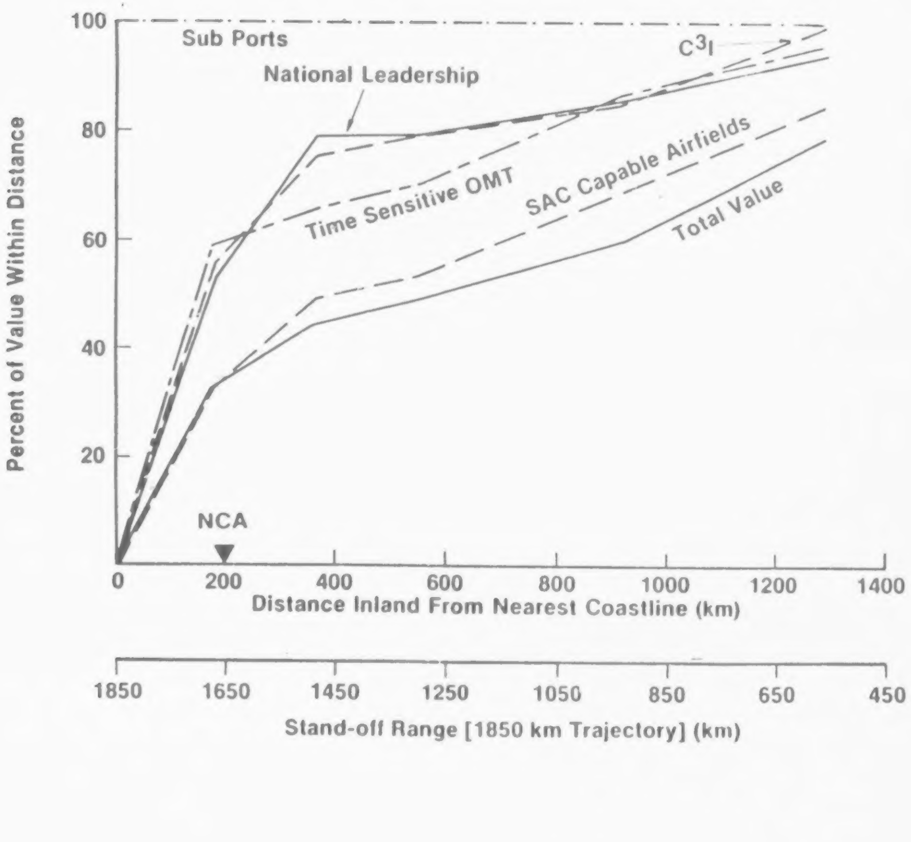
So what we are suggesting, then, is that we have five coastal sites—three on the east coast and two on the west coast. And I will talk a little bit more about that geometry of layout.

Here we have inventoried for a Delta boat; remember that the Typhoons are being kept back, but the Delta boats are still operating in the broad ocean area, at least as I understand it. The Yankee boats are being repositioned.

For each of these sites we would suggest a ground-based radar for acquisition and track. It is also possible that we could use a ground-based sensor tracking system or probe rather than the radar. And here for battle management and C^3 purposes we would suggest going with the distributed battle manager, as is the plan for SDI right now.

So now if you take the maximum 140 interceptors—again inventoried for the Delta boat and understand that a Delta boatload would not come necessarily into one site, so you could use interceptors from other sites against a boatload—you would end up with about 700 interceptors in addition to the 100 at Grand Forks. So clearly you are talking outside of the existing ABM Treaty.

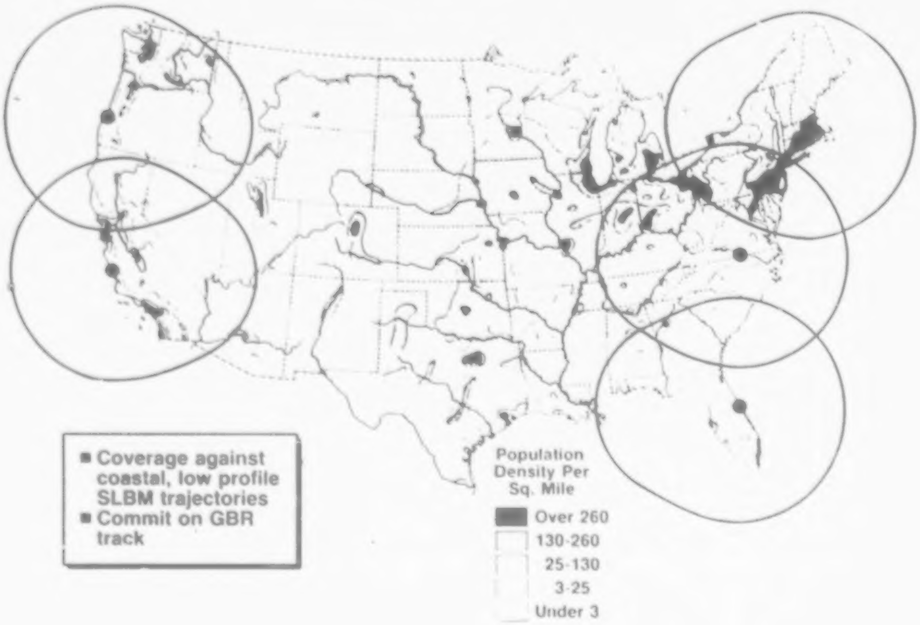
COASTAL TARGETS VULNERABLE TO SLBM THREAT



Now let me say that you can use only one of the sites that I have suggested, and I will come back to that. Here I have simply quantified to some extent the assets that are located along the coast.

If you look at 600 kilometers or thereabouts in from the coast you can see that in terms of NCA communication nodes, strategic assets, other military targets, that we have 50 percent or more of those targets located in that band along the coast. And it is that band that is thinly covered, let me say, from Grand Forks.

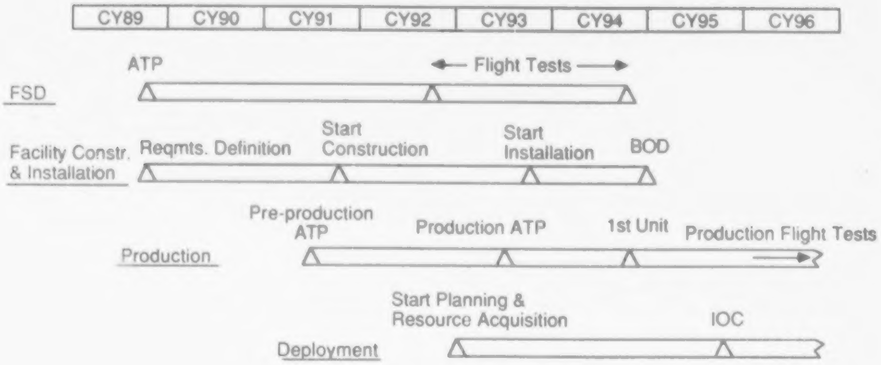
HEDI COASTAL DEFENSE FOR ALPS


■ Coverage against coastal, low profile SLBM trajectories
■ Commit on GBR track
Population Density Per Sq. Mile
Over 260
130-260
25-130
3-25
Under 3

So here I have simply shown or suggested a deployment of three on the east coast, two on the west coast. Think of these circles as simply templates. They are coverage that is related to a single shot kind of scenario, so you can get the lower leakage that I talked about, and it is related to the close-in SLBM launch.

So, as I said, think of them as templates so you can move them around as you see fit in terms of location. You can pick one, or you can now have sites at Grand Forks and one at Washington, or NCA. You can pick the arrangement I have here. You might want to put one in Texas. Certainly Alaska and Hawaii are areas of concern. So the point is we have flexibility in that coverage.

HEDI ALPS DEPLOYMENT SCHEDULE



Let me comment before I talk to schedule that we have also costed out that installation at each of those sites—that is one of the sites—would cost on the order of $2.5 billion to $3 billion, to include the launch facilities, the interceptors, the acquisition system, the battle management C^3 and so forth. So you are looking at, if you presume to go with all five, you would need $15 billion. If you choose to go with one, it is on the order as I said of $2.5 billion to $3 billion. So the replication cost is, let us say, $3 billion.

Here I have shown a schedule; it is a 5-year schedule to complete the full scale development, FSD. During that same time we would be going through the definition of the launch facilities and get to beneficial occupancy date or BOD at about the same time we have completed the full-scale development program. And then have the initial operational capability, IOC, about 1 year after that.

So if we do business as usual it will take us, we suggest, on the order of 6 years to have 10 percent of our assets installed at the first location. If you choose to direct management approaches like that which was used on the Delta 180 and 181 program, or to expedite, for example, the process of getting through the environmental impact statement and other such expediting techniques that you could choose, I believe that you could shorten that schedule by a year to a year and a half, but probably not much more than that.

ALPS SUMMARY

- Deployment at Grand Forks can defend against accidental ICBM and Long Range SLBM threat
- Low leakage achieved through dual phenomenology acquisition and interceptor homing
- Coastal sites provide additional defense against ICBM and Long Range SLBM and against Short Range SLBM launches into coastal areas (unauthorized launches)
- Experience from operating a defense system would be invaluable in the event of a Soviet breakout from the ABM treaty

In summary, then, of all that I have said, a deployment at Grand Forks can defend against the accidental launch for the ICBM and the long-range SLBM. We believe that it is reasonable and prudent to have a two-layered system at Grand Forks.

If we are only going to Grand Forks, then let us maximize the gain for going there and maximize the effectiveness of the system that we put there by having that two layered system.

We believe also that there is indeed need for the coastal sites to provide immediate protection against the SLBM launch, and also, of course, augment our capability against the ICBM and long-range SLBM launch.

To repeat again, the experience that we could gain out of Grand Forks only or Grand Forks plus NCA, or whatever it is that you decide that we should do, will certainly give us advantage in terms of design maturity, operational experience, production experience and so forth to go to a more extensive system should you decide at some later date that that is necessary.

I thank you very much.

[The prepared statement of Mr. Hofferth follows:]

PREPARED STATEMENT OF D. DEAN HOFFERTH, DIRECTOR, PROGRAM MANAGER, HIGH ENDOATMOSPHERIC INTERCEPTOR PROGRAM (HEDI) McDONNELL DOUGLAS ASTRONAUTICS COMPANY

Mr. Chairman and distinguished members of the committee, on behalf of the McDonnell Douglas Astronautics Company, I welcome this opportunity to contribute to your timely examination of the technical feasibility of the Accidental Launch Protection System (ALPS) as suggested by Senator Sam Nunn. I applaud the efforts of this distinguished subcommittee to explore the prospects of a near term defense against a few missiles that might be launched by accident. Such a defense would capitalize on the technology successes of the Strategic Defense Initiative research program. My remarks today will be based upon a study which we have done within McDonnell Douglas to understand how a cost effective ALPS might be architected. This study was initiated several months ago and we will be revising it as we continue further analysis. It is clear at this point, however, that there are benefits that can be derived from an ALPS deployment and it is those benefits that I will be talking about in more detail in the next few minutes.

ALPS MISSION

In order to develop an architecture for an ALPS deployment it is necessary that we first understand the mission for that deployment. Senator Nunn suggested in his speech on 19 January that such a system should safeguard against accidental and unauthorized ballistic missile launches into the United States. He further suggested that such a defensive deployment should be accomplished, to the best of our ability, in conformance with the terms of the 1972 Anti Ballistic Missile (ABM) treaty, or at most, require only modest amendments to that treaty. We can further state that such a system should strive for the capability to intercept all of the incoming reentry vehicles, i.e., it should be a low leakage system. And finally, it is important that we identify a system that draws upon our investment in ballistic missile defense research and development, which most certainly means utilization of elements of the Strategic Defense Initiative (SDI) program that are currently in development.

ALPS THREAT - 1993

As a second step in developing a system concept for an ALPS deployment, we need to define the threat that this architecture must address. Since that threat is defined as accidental and unauthorized launches into the U.S., the question becomes, what is an accidental launch and how do we define an unauthorized launch? We have presumed, for our study, that an accidental launch is a single ICBM or SLBM booster launch. If you look at the worst case for such an accidental launch, we conclude that for the ICBM it is an SS-18 with its 10 or more reentry vehicles or the SS-N-18 launched from a ballistic missile submarine with its 7 reentry vehicles. We have further defined the unauthorized launch as a single flight of ICBMs or a boatload of SLBMs. The worst case for an unauthorized launch becomes a flight of SS-18 ICBMs with approximately 100 reentry vehicles. In the case of the SLBM, it is a boatload of missiles launched from the Typhoon class ballistic missile submarine which carries the SS-N-20 booster with as many as 200 or more reentry vehicles.

So, as we look at these definitions of accidental and unauthorized launches, we can begin to understand that a treaty-limited deployment of 100 interceptors at Grand Forks can handle the accidental launch case, however, complete defense of the United States cannot be achieved. With only these 100 interceptors we will be unable to defend against the more severe unauthorized launch. I will come back to this point as I proceed further through the presentation.

ATTACK CORRIDORS

This viewgraph portrays the approach corridors for the ICBMs launched from Russia. You are aware that the Russians have located their ICBM launch facilities across the breadth of their country. We have simply defined the approach corridors here as a set of triangles with their apex at the east and west ICBM launch points in their country. Additionally, you will notice that we have the apex of a third triangle located just above Norway and Sweden which is near the Typhoon submarine home ports or what are called bastion. And as you can see, SLBMs launched from this bastion will look very much like ICBMs coming over the pole. I believe that we must also include consideration for the ballistic missile submarines operating in the broad ocean area or in their patrol zones closer in to our east and west coasts. While current Soviet operating doctrine would seem to mitigate against consideration of SLBMs launched from these areas, it seems to me that we would leave ourselves unnecessarily vulnerable if we fail to consider them as we develop this ALPS architecture.

ALPS DEPLOYMENT AT GRAND FORKS

Having defined the mission and described the threat this mission must address, the architecture for a treaty-limited deployment at Grand Forks, we believe, should include the following elements: 70 Exoatmospheric Reentry Interceptor

Subsystem (ERIS) plus 30 High Endoatmospheric Defense Interceptor (HEDI) interceptors installed in the existing SPRINT and SPARTAN silos respectively at Grand Forks. Utilization of the early warning information available from Defense Satellite Program (DSP) and Ballistic Missile Early Warning System (BMEWS). Tying the Grand Forks facility for C^3 purposes into the Cheyenne Mountain facility and adding the battle management capability at that facility as well. The addition of a ground based radar (GBR) and the ground based surveillance tracking system (GSTS) as the acquisition and tracking sensors for interceptor commit and final engagement.

This combination of acquisition sensors and interceptors will provide a two layered defense system which will significantly lower the leakage. This dual phenomenology is achieved with the acquisition sensors because the operating band of the GSTS is in the long wave infra red i.e., optical, and the radar, in this case, operates at x-band radar frequencies. In a similar manner the ERIS interceptor operates in the exo atmosphere while HEDI completes its intercept in the endo atmosphere. Both of these interceptors use infra red seekers but ERIS is in the long wave infra red and HEDI operates in the medium infra red waveband.

TWO LAYERS, DUAL PHENOMENOLOGY INCREASE EFFECTIVENESS

As I mentioned before, the dual phenomenology that we are suggesting by the architecture that I have just outlined provides an opportunity for improvement in leakage (probability of each reentry vehicle penetrating the defense). With only one acquisition sensor and launching either an exo or an endo interceptor the leakage as you can see is approximately 14 percent. If we launch two shots while utilizing the data from this single acquisition sensor, we can improve leakage to approximately 6 percent. With two acquisition sensors and two launches of the same kind of interceptor, the leakage improves to 4 percent. By using an exo and an endo interceptor with the two acquisition sensors the leakage improves further to 2 percent. We can improve this further, as noted, by shooting two exo interceptors and one endo interceptor and get to 0.8 percent leakage.

Keep in mind, that since we have no defense system, the leakage in the event of any kind of ballistic missile attack is 100%.

Let me go on and talk cost in the next viewgraph and then I will come back and show you how this probability of kill relates to cost.

COST FOR GRAND FORKS DEPLOYMENT

As you can see from this viewgraph we have estimated the cost of the system we have described for deployment at Grand Forks. These costs are based for the most part, on cost estimating relationships (CER) that we have developed from approximately 30 years of involvement in ballistic missile defense activities. The HEDI, GSTS, and BM/C^3, and system engineering and integration (SE&I) costs were developed using these CERs. The ERIS costs were provided by Lockheed and likewise the radar costs were received from Raytheon. As you can see the total cost for a deployment as we have suggested at Grand Forks comes to just over $8 billion. The normal accuracy band of CERs is considered to be ± 20 percent. Based on this the total cost for the deployment could be as high as $10 billion.

ALPS CONFIGURATIONS COST EFFECTIVENESS

I indicated to you earlier that I would show you the relationship between leakage and cost. As you can see from this viewgraph, if we deploy with a single acquisition sensor and interceptor, the leakage will be in the order of 5 percent and the system costs will be approximately $4 billion. If low leakage is indeed a requirement of this ALPS system, the two-sensor, two-interceptor deployment will be required to achieve leakages of less than 1 percent and the cost for this system will be approximately $8 billion. So it is clear that there must be an understanding of the mission requirements before a decision can be made as to the architecture of the ALPS system.

GRAND FORKS ALPS DEPLOYMENT SUMMARY

To summarize for a deployment at Grand Forks, we believe that it is appropriate to deploy two independent layers of sensor and interceptors to achieve the desired low leakage. A single layer system could be deployed at a lower cost than that associated with the two layer system, however, the higher level of leakage becomes an important factor that must be considered.

With this two layer system, both the ERIS and HEDI interceptors are committed early utilizing sensor data based on exo track. By making this early commit there is sufficient time for both interceptors to accomplish an intercept of the ICBM and long range SLBM over most of the United States. We are continuing our analysis to define how much of the United States can effectively be covered from the single site at Grand Forks, but we have done enough to feel that some, if not all of the east and west coasts cannot be covered effectively.

We believe additionally, that a two layered system deployed at Grand Forks will give us valuable experience in maturing the design for the deployed elements, in establishing production capabilities, in integrating the BM/C^3, and finally in operating all of these systems together. I might point out that the Soviets have many years of valuable experience with their two layered BMD system around Moscow. This experience would provide an invaluable base from which to proceed toward a more expensive defense deployment, if that decision was made.

EXPANDED COASTAL DEPLOYMENT FOR ALPS

Up to this point I have talked about a treaty-limited deployment at Grand Forks. The treaty allows the deployment of only 100 interceptors. If you accept the definition of an unauthorized launch, a treaty-limited deployment simply does not allow enough interceptors to engage all of the potential incoming RVs. Additionally, as I stated in the summary with regard to the Grand Forks deployment, it will be difficult to effectively defend all of the United States, in particular the coastal areas. With these things in mind, we have looked at a deployment scheme that would protect both the east and the west coast. As you are all keenly aware, there are significant national assets located in the band along the coasts of this country. If you provide additional defenses to protect these areas you also gain additional defensive capability in conjunction with the site at Grand Forks.

In order to protect the coastal regions, we believe that approximately five defensive sites will be required. In the study we have done to date, we have looked at only HEDI interceptors at these sites, so the data you see here will show only the HEDI interceptor. It is my belief, however, that there is a more cost effective deployment that would include ERIS along with HEDI, and we are studying this right now. Each of the coastal sites, we believe, should be defended with approximately 140 interceptors. This inventory is based on the number of reentry vehicles that could be launched from a Delta III class ballistic missile submarine. We have used for the study to date, the ground based radar at each of these sites for forward acquisition and tracking purposes, however, the GSTS could be used for this function instead of the GBR. While we suggested tying the Grand Forks facility to Cheyenne Mountain for purposes of BM/C^3, for these coastal sites, it will be preferable to utilize the distributed battle manager approach. This means that while each coastal site would receive a "missile launch authorized" signal from Cheyenne Mountain, the battle management function would be accomplished at each site.

COASTAL TARGETS VULNERABLE TO SLBM THREAT

You are all very much aware of the of national assets located within 300 miles of our coastlines. This viewgraph simply quantifies the extent of those assets. As you can see they include a significant portion of our national leadership and our national command authority (NCA), our strategic assets and C^3I capabilities, as well as a large portion of our other military assets. By deploying interceptors at the five sites that we have suggested we could provide defense for these coastal assets against the SLBM threat as well as for RVs coming into this area from over the pole.

HEDI COASTAL DEFENSE FOR ALPS

This viewgraph depicts the location of the five defensive sites along the coast. As you can see, we have deployed these with three on the east coast and two on the west coast. Do not accept these site locations as a final recommendation. Each of the defended areas could be moved around, eliminated, or added to as the final study or political determination might dictate. For example, it may be important to provide a site in the area of Texas for protection against SLBMs launched from within or just outside of the Caribbean.

HEDI EARLY DEPLOYMENT SCHEDULE

This schedule depicts a business as usual approach for accomplishing a full scale development (FSD) program related to an ALPS deployment. As you can see, the duration of the FSD is shown as five years. The beneficial occupancy date (BOD) for the ALPS facility as we have shown it on this schedule would occur just shortly after completion of FSD. The initial operational capability (IOC) for the Grand Forks site would occur approximatly one year later. IOC, for the purposes of this schedule, was defined as the point at which ten percent of the interceptors were installed in the silos. It is possible, that by using a program management approach similar to that which was utilized for the Delta 180 program, this schedule could be shortened by as much as one year. Another area that would require acceleration by the acquisition agency in order to shorten the time to IOC would be preparation of the environmental impact statements required by the element contractors and for the launch facilities. The point is that if there was a compelling need for accelerating the deployment process there are steps that could be taken to accomplish this.

ALPS SUMMARY

In the presentation up to this point I have talked about a treaty-limited deployment at Grand Forks and suggested a deployment that would allow defense of our coastal assets that would, of necessity, require modification of the treaty. Let me summarize what I have just gone over in detail with you.

A deployment at Grand Forks would indeed provide a defense of a significant portion of the United States against an accidental ICBM or long range SLBM threat. But it would leave the significant coastal areas of the United States undefended.

In addition to a site a Grand Forks, we believe that it is important to consider defense site in the coastal areas to provide defense for the extensive assets that are located in this region.

By utilizing the dual phenomenology provided by both the GBR and GSTS, in conjunction with ERIS and HEDI, we can provide a defense from Grand Forks that will achieve the lowest leakage level.

And finally, the experience gained from operating a defense system at either Grand Forks alone or with the possible addition of coastal sites, would provide an invaluable base from which to proceed to a more extensive defensive system if that decision was made.

Senator EXON. Thank you. I appreciate your briefing. You have done an excellent job. Let me see if I can clarify. It is just somewhat difficult for those of us who do not keep up with things like this the way you do to understand for sure what you are saying.

SYSTEM AT GRAND FORKS

You started out by saying that for in the range of $4 billion to $6 billion we could have a system at Grand Forks that would provide about 80 percent defense. For double that, $8 billion to $10 billion, we could have 99 percent for 10 reentry vehicles coming in. Have I got those figures?

Mr. HOFFERTH. It is really going to be higher than 80 percent. It will probably be on the order of 94 percent of probability of killing the reentry vehicle or on the order of 5 or 6 percent leakage for a single-layered system. In order to get the 1 percent leakage, we are suggesting you need the two-layered.

Senator EXON. And for the $15 billion that you said, that would protect from how many?

Mr. HOFFERTH. Let us see. It would be more than 500.

Senator EXON. It is true, is is not, that if we could limit this to Grand Forks or one location we would be in compliance with the treaty more so than if we started scattering things about, right?

Mr. HOFFERTH. Let me say that I agree with that statement, with certainly the concern that Mr. Bell has suggested and Senator Wilson has suggested. I have not looked at and do not presume to make judgments with regard to the specific details of territorial coverage.

Senator EXON. Okay. Let me ask you one further question, and I am wondering if you looked at this at all. Although it was vehemently denied by former Secretary of Defense Cap Weinberger, there were those of us who said well, as long as we are about the business of deploying an SDI system, would it not be wise to so structure our initial deployment so that it would give the greatest protection to our land-based ICBMs. We recognize that they are the most vulnerable part of our triad to any attack including a surprise "bolt out of the blue" attack, which does not seem very likely but is always a possibility.

Now we are doing experimentation now with the rail deployment of the MX. I would take it that the system that you have just outlined would not be too difficult to reposition or redeploy, the bottom line consideration being the protection of the area that the MX deployment would be deployed to in case of an attack.

My first question is, would that provide some help?

Second, let us say there is an accidental firing some place. We would not be able to identify very early whether that is accidental or whether it is the start of an all-out attack. We have always assumed if it was an all-out attack there would be almost simultaneous launch.

Could this system be designed with a holdback option to see whether there was only going to be one accidental or major mistake, and if we could determine later on for certain where that warhead was going?

And what I am getting back to is, could not a system like this be an advantage also, a key advantage for protection of our land based ICBM force, wherever it is under all circumstances? Does that logically fit a further extension of the plan that you have outlined?

Mr. HOFFERTH. The answer is yes, it does, sir. You know, if you have 100 interceptors at Grand Forks clearly you cannot defend effectively against a massive attack, a "bolt out of the blue" of any size at all. The architecture that I have outlined here—that is, the ERIS and the HEDI and the two interceptor systems—is certainly a system that would have good effectiveness against a large attack.

Now, will it be as effective as the four-layer system? I think the answer to that is no. The question of cost-effectiveness, we have not worked through all of that, but certainly the layered approach is one that we all understand, we all endorse.

So while the ground-based system, you can build it to have high effectiveness, is that the one you want to build? I leave that to others to judge.

Can it be effective in defending our offensive forces? Yes, sir, it certainly can.

Senator EXON. Thank you very much, Mr. Hofferth. We will proceed with the next presentation now from Lockheed. Mr. Loomis or Mr. Fisher, whichever gentleman wishes to start out.

STATEMENT OF WILLIAM C. LOOMIS, DIRECTOR OF GROUND-BASED DEFENSE SYSTEMS, LOCKHEED MISSILES AND SPACE CO., ACCOMPANIED BY KENNETH A. FISHER, MANAGER OF ADVANCED SYSTEMS, LOCKHEED MISSILES AND SPACE CO.

Mr. LOOMIS. Thank you, Mr. Chairman. I am pleased to be here for Lockheed to talk about what work we have been doing over the last several years, in particular the last 2 years. We have been looking at how the ERIS technology or ERIS derivatives might be applicable to a treaty-limited defense. If I may have the next viewgraph, please.

ERIS/ALPS
TREATY LIMITED

- ERIS/ALPS ONLY ONE OF SEVERAL ALPS CONCEPTS
- DESIGNED TO BE COMPLIANT WITH 1972 ABM TREATY
  - REQUIRES NO MODIFICATION
  - USES RADARS ONLY AS ALREADY AUTHORIZED
- PROTECTS ENTIRE CONUS FROM ONE SITE AGAINST ICBM LAUNCHES AND "ARCTIC" SLBMs
- PROTECTS AGAINST MOST SLBM ACCIDENTAL LAUNCHES EXCEPT SHORT RANGE SLBMs.
- ALPS MISSILE DESIGN BASED ON ERIS FTV TECHNOLOGY
- LOGICAL FIRST STEP FOR A MORE "ROBUST" DEFENSE
- PROVIDES PROTECTION AGAINST ACCIDENTAL LAUNCH
- PROVIDES PROTECTION AGAINST LIMITED UNAUTHORIZED LAUNCH - GROWTH CAPABILITY FOR MORE EXTENSIVE ATTACK

I would like to summarize with a couple of charts here at the beginning to more or less tell you what I am going to discuss. ERIS ALPS, of course, is only one of several ALPS concepts that people are going to be talking about, that we are going to hear over the course of the next few months.

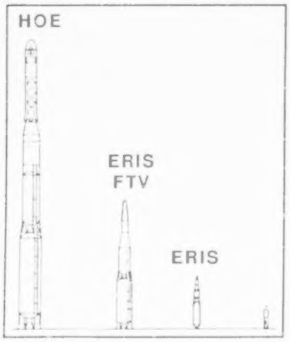
In ERIS ALPS we have defined a concept that is compliant with the 1972 ABM Treaty. It requires no interceptor modifications and it uses existing radars as they now functionally operate.

Now, what kind of capability does that give us? It protects the entire CONUS from one site against all ICBM launches and all Arctic SLBMs—that is, those that are in their normal patrol areas, such as the Typhoon, which are effectively "wet" ICBMs.

The kind of leakage that one would get varies. With a one-tier ERIS system, very similar to what Mr. Hofferth talked about, we say it is about 4 percent to 6 percent, depending on assumptions for reliability. It can protect against most SLBM accidental launches, except short-range SLBMs, just like Mr. Hofferth talked about. ERIS, being an exoatmospheric system is effective only when targets are outside the atmosphere. Short-range SLBMs spend very little time outside the atmosphere.

The ALPS missile design is based on the ERIS FTV, functional technology validation, program, the one for which we are under contract to SDI and the Army. I believe, as Mr. Hofferth has stated, ALPS is a logical first step for what I would call a more robust defense, whether it be strategic asset defense or defense of cities. It will provide protection against accidental launch and against limited unauthorized launch. It will have growth capability for a more extensive attack.

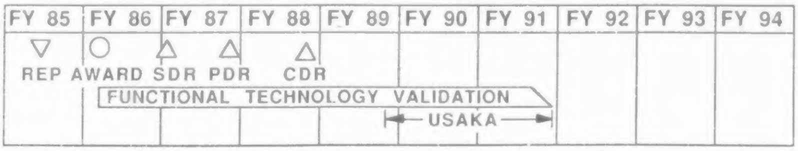
ERIS FTV PROGRAM



CUSTOMER: SDIO/U.S. ARMY SDC

PURPOSE: DEVELOP TECHNOLOGY FOR VALIDATION OF A LOW-COST, NONNUCLEAR, GROUND-LAUNCHED INTERCEPTOR

SCOPE: 3 FLIGHTS
5 OPTIONAL FLIGHT VEHICLES



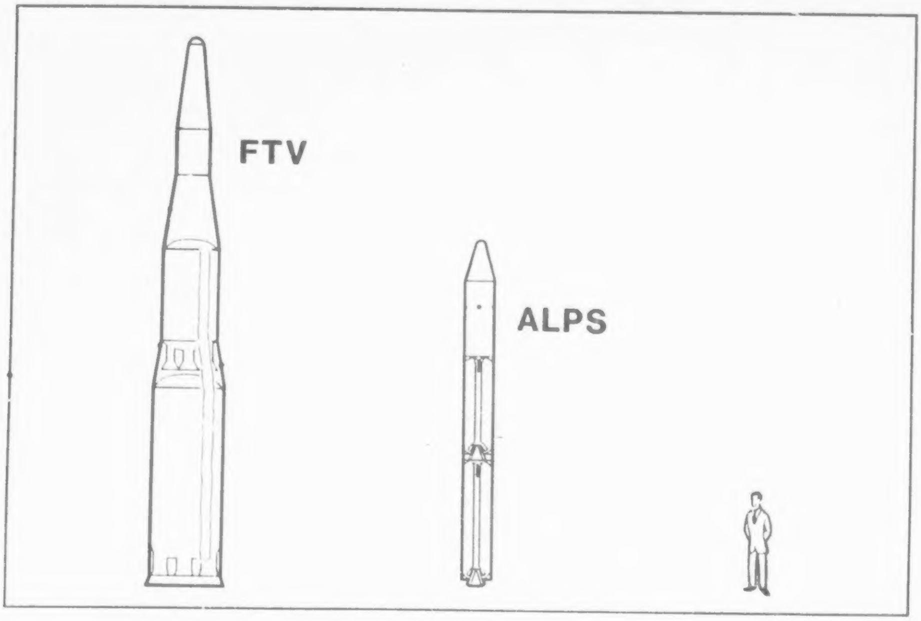
The purpose of this program is to develop technology for validating a low-cost, nonnuclear, ground-launched interceptor. We demonstrated with the Homing Overlay Experiment (HOE) interceptor in 1984 that you can successfully track, conduct and intercept an ICBM mode warhead.

I might add here that my colleague was the program manager for McDonnell-Douglas on HOE, as I was for Lockheed, so I think we know something about this kind of intercept. The ERIS FTV program was initiated in early 1986.

We are going through a critical design review in July. We will begin flying in early 1990. We are less than 2 years away from our first flight test. The vehicle we will be testing is shown in the middle.

It is an off-the-shelf booster with a kill vehicle that uses today's technology. The one we tested in 1984, the HOE, is on the left. The one on the right—and this is to scale—is the interceptor that one might talk about for a phase I deployment in the mid- to late-1990s.

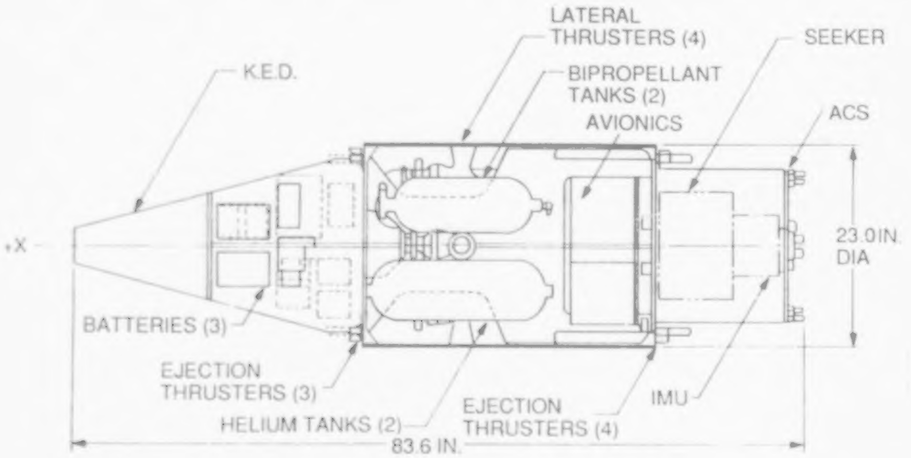
ERIS FTV VERSUS ALPS



This shows the comparison of the FTV that we are flying in 1990 to a design that we are calling ALPS—an ERIS technology derivative where we would use our FTV payload, which is about a 250-pound vehicle, and put it on a two-stage booster designed for this size payload.

The ERIS FTV Interceptor Minuteman system is an overt design—that is, about a 4,000-pound vehicle that has a Delta velocity capability of about 16,000 feet per second, which would allow it to defend the whole country against ICBMs.

KILL VEHICLE ASSEMBLY


LATERAL THRUSTERS (4)
SEEKER
K.E.D.
BIPROPELLANT TANKS (2)
AVIONICS
ACS
+X
23.0 IN. DIA
BATTERIES (3)
EJECTION THRUSTERS (3)
IMU
EJECTION THRUSTERS (4)
HELIUM TANKS (2)
83.6 IN.

This is a drawing of the ERIS FTV kill vehicle that we are building; it will be flight tested in 1990.

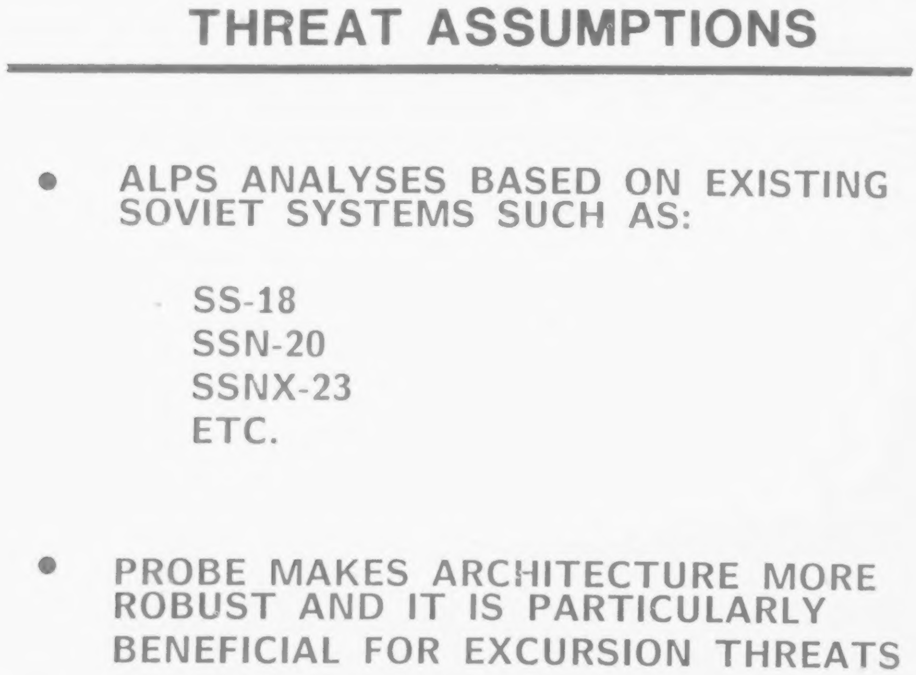
GROUND RULES AND ASSUMPTIONS

- ABM TREATY COMPATIBLE
  - MISSION-LIMITED DEFENSE
    - 100 INTERCEPTORS
  - BASING AT GRAND FORKS
    - SILO LAUNCHERS
  - GROUND-BASED RADAR (UPGRADED PAR) FOR BATTLE MANAGEMENT
  - ATTACK WARNING AND CUEING FROM EXISTING ASSETS (EARLY WARNING SATELLITE, BMEWS, AND PAVE PAWS)
  - LWIR PROBE FOR ENHANCED DISCRIMINATION/DESIGNATION

I would now like to move on to the ground rules and assumptions that we have made. These, of course, are Lockheed's assumptions and not to be construed with others that one might see.

We believe ALPS is a mission-limited defense using 100 interceptors deployed at Grand Forks, and an upgraded battle management radar. We really recommend the new ground-based radar and other planned upgrades to existing radars. We use the present attack warning and cueing system, using existing assets, the early warning satellites, BMEWS and PAVE PAWS.

We also recommend for better system efficiency that an LWIR probe or GSTS, as Mr. Hofferth talked about, be there to assist the radars. You get much better discrimination when you have dual phenomenology, radars plus LWIR. In fact, it makes it extremely difficult for the attacker to effectively deploy countermeasures.



THREAT ASSUMPTIONS

- ALPS ANALYSES BASED ON EXISTING SOVIET SYSTEMS SUCH AS:

  SS-18
  SSN-20
  SSNX-23
  ETC.

- PROBE MAKES ARCHITECTURE MORE ROBUST AND IT IS PARTICULARLY BENEFICIAL FOR EXCURSION THREATS

Mr. Hofferth went over our threat assumptions in more detail than I, so I will essentially say that we assumed in all of our analyses that we were looking at the kind of threats that we are seeing today with some extrapolation. But based on the intelligence data that we have seen I think the architecture that I am talking about and the growth architecture is certainly the framework for a more robust system.

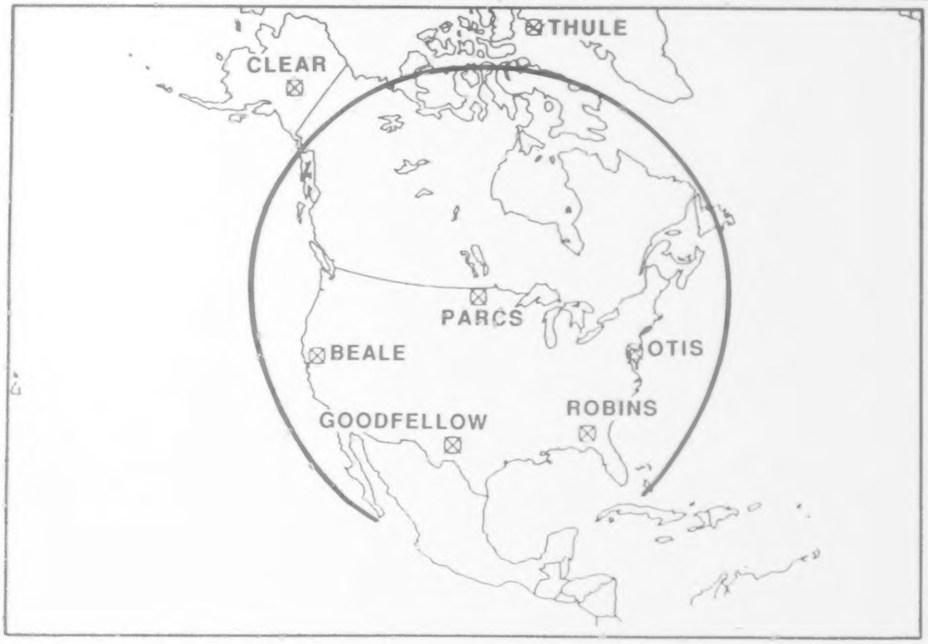
BENEFITS OF TREATY LIMITED ALPS DEPLOYMENT

- ACCIDENTAL/UNAUTHORIZED LAUNCH
- Nth COUNTRY
- OPERATIONAL EXPERIENCE
- HEDGE FOR STRATEGIC ASSET DEFENSE BREAKOUT

Some of the benefits of such a system are, of course, the accidental or unauthorized launch, and Nth country attack. You can defend CONUS from most Nth country attacks, assuming they are not right on our border.

I think probably the two most important aspects of such a system are gaining operational experience, one thing we sadly lack, and a hedge against a treaty breakout. Rather than being 10 years away all the time from any kind of ABM system, with a system like this in the field, we would be 2 or 3 years from having a real robust system.

DEFENDED FOOTPRINT — ICBM THREAT



Mr. Loomis. The next chart shows the footprint of an ERIS, again the 16,000-foot-per-second ERIS interceptor deployed at Grand Forks against all ICBMs.

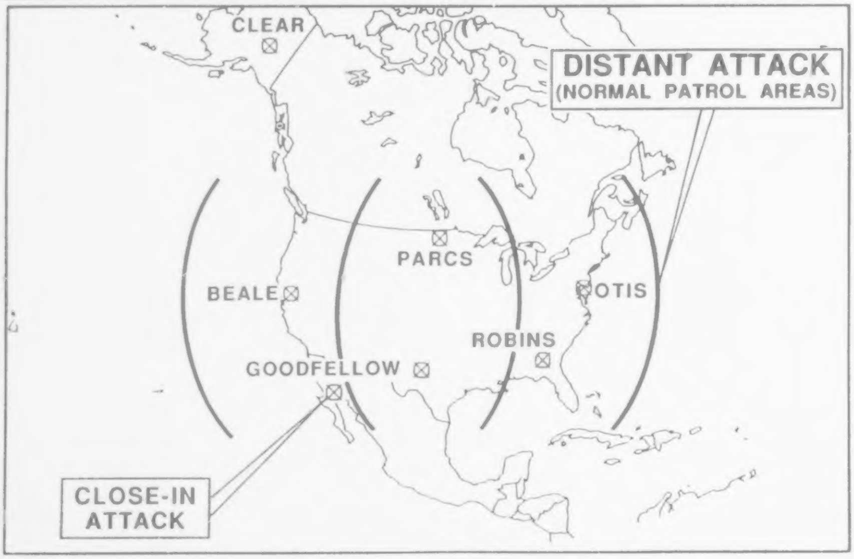
Now, how does this system work? It obtains cueing from the early warning satellite, the three BMEWS radars or PAVE PAWS radars. Clear, Thule, Fylingdale, or Beale and Otis would perform their normal early warning function, which would, through the battle management system at Cheyenne Mountain, provide cueing information to our interceptor.

That warning radar information is not good enough by any means to conduct an intercept. So we need a battle management radar augmented by an LWIR probe for better discrimination, to conduct the intercept.

EARLY WARNING SYSTEM

- EARLY WARNING RADARS (CUE DEFENSE)
  - BMEWS I (THULE) – BMEWS PHASED ARRAY UPGRADE OPERATIONAL IN 1987
    ACTIVATE ALL OPTIONAL ELEMENTS
  - BMEWS III (FLYLINGDALE) – BMEWS PHASED ARRAY UPGRADE PLANNED FOR 1991
    ACTIVATE ALL OPTIONAL ELEMENTS
  - BMEWS II (CLEAR) – BMEWS PHASED ARRAY UPGRADE NOT PRESENTLY PLANNED
    UPGRADE TO SAME CAPABILITIES AS THULE
  - PAVE PAWS – BOTH SITES CURRENTLY OPERATIONAL PHASED ARRAY RADARS (WEST – BEALE / EAST – OTIS)
    ACTIVATE ALL OPTIONAL ELEMENTS
    UPGRADE SOFTWARE
  - EARLY WARNING SATELLITE

DEFENDED FOOTPRINT — SLBM THREAT


CLEAR
DISTANT ATTACK
(NORMAL PATROL AREAS)
PARCS
BEALE
OTIS
ROBINS
GOODFELLOW
CLOSE-IN ATTACK

The next chart shows the capability against SLBMs. Now if you are talking about an SLBM launched from a Typhoon, which are normally very far north and not too far from the mother country; then one has a footprint that does indeed defend the whole country.

On the other hand, if you are talking about SLBMs like the Delta or possibly the Yankee, although I believe the Yankees are being moved out, then there is some possibility that you might have a short range trajectory.

The inside footprint assumes a close-in attack from an SLBM 500 miles off the coast. An ERIS system cannot defend the coast against a close-in attack from only a close-in launch site.

ABM RADAR

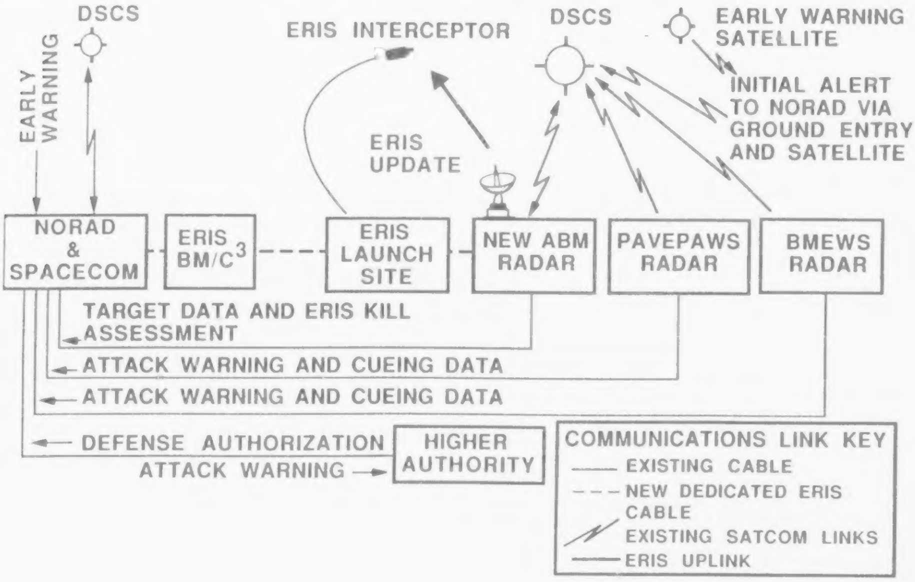
REPLACE PARCS WITH NEW STATE-OF-THE-ART ABM RADAR

- 360° COVERAGE
- ENHANCED DISCRIMINATION CAPABILITIES

One of the things we would like to see if one went forward with an ALPS system is a new ABM radar, something that has three faces. Whether it be L-band or the newer technology X-band, it would have much better discrimination capability.

The present PAR ABM radar only has one face. Therefore you cannot conduct the battle management for the coastal intercepts because you just cannot see them. So, three faces are necessary.

ERIS COMMUNICATIONS SYSTEM

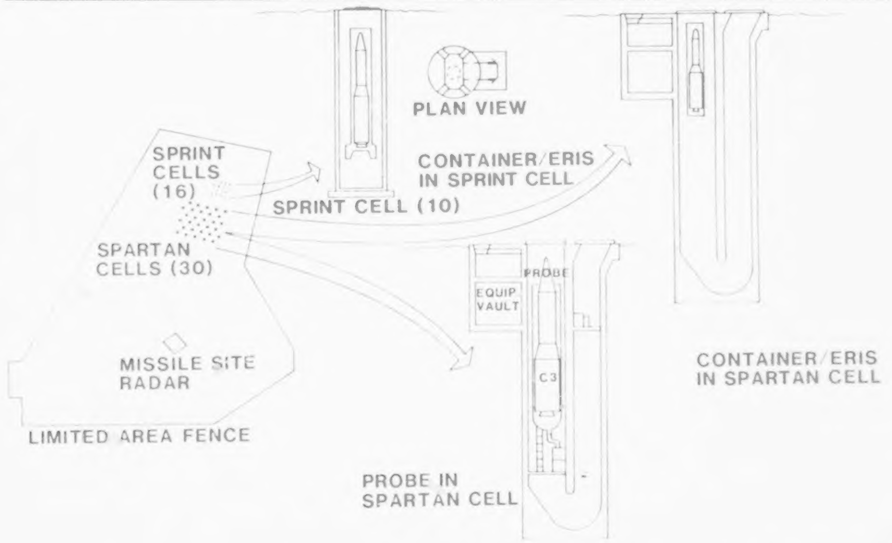

DSCS
EARLY WARNING
ERIS INTERCEPTOR
DSCS
EARLY WARNING SATELLITE
INITIAL ALERT TO NORAD VIA GROUND ENTRY AND SATELLITE
ERIS UPDATE
NORAD & SPACECOM
ERIS BM/C3
ERIS LAUNCH SITE
NEW ABM RADAR
PAVEPAWS RADAR
BMEWS RADAR
TARGET DATA AND ERIS KILL ASSESSMENT
ATTACK WARNING AND CUEING DATA
ATTACK WARNING AND CUEING DATA
DEFENSE AUTHORIZATION
ATTACK WARNING
HIGHER AUTHORITY
COMMUNICATIONS LINK KEY
EXISTING CABLE
NEW DEDICATED ERIS CABLE
EXISTING SATCOM LINKS
ERIS UPLINK

Battle management C³ is a buzzword that gets a lot of press and what have you but for such a treaty-limited system where you are talking about 100 interceptors against a limited attack, it almost exists today. I mean, one would need only to put in an ERIS battle management C^3 line as well as the uplink to our interceptor to be able to give it the necessary information to conduct its battle.

The throughput, for example, for such a system is not much more than a VAX-11-785, which is a standard computer that most of us use in the aerospace industry. So this ALPS system basically exists in terms of battle management C^3.

What we have assumed is pretty much what Mr. Hofferth assumed. We have assumed very poor discrimination. One interceptor or one ICBM, for example, might have as many as 25 credible objects or decoys that might be along with the RV. So you have got to send out roughly 50 interceptors to go after those 25 objects to obtain the 4 to 6 percent leakage that Mr. Hofferth was talking about.

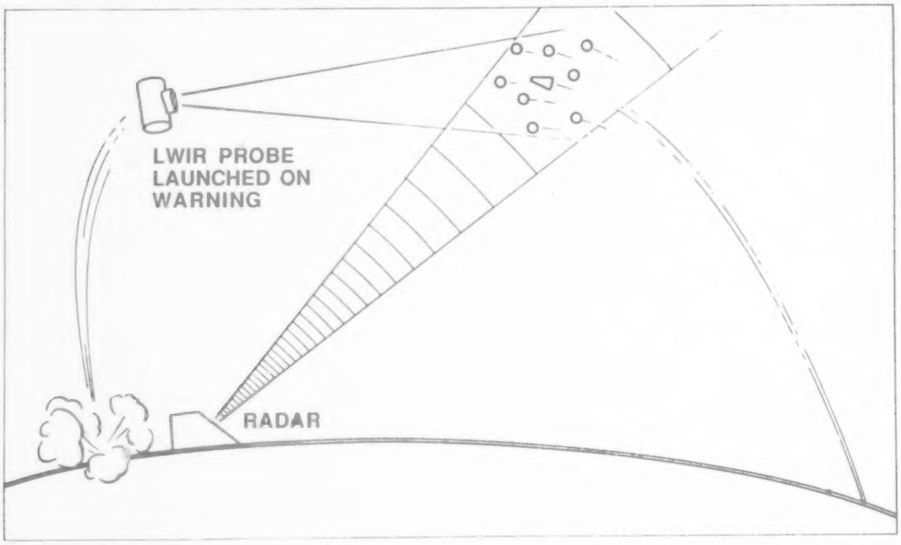
MSR SITE - GRAND FORKS


PLAN VIEW
SPRINT CELLS (16)
CONTAINER/ERIS IN SPRINT CELL
SPRINT CELL (10)
SPARTAN CELLS (30)
PROBE
EQUIP VAULT
C3
MISSILE SITE RADAR
CONTAINER/ERIS IN SPARTAN CELL
LIMITED AREA FENCE
PROBE IN SPARTAN CELL

Mr. Loomis. We also looked at deploying these in the existing silos. The interceptor on the right is deployed in a Spartan silo. One could put four of these missiles in a Spartan silo, but because the treaty requires only one missile per launcher, we have put one in the Spartan silo as well as in the Sprint silos. We have deployed the LWIR probe, on a refurbished C-3 booster that augments the system.

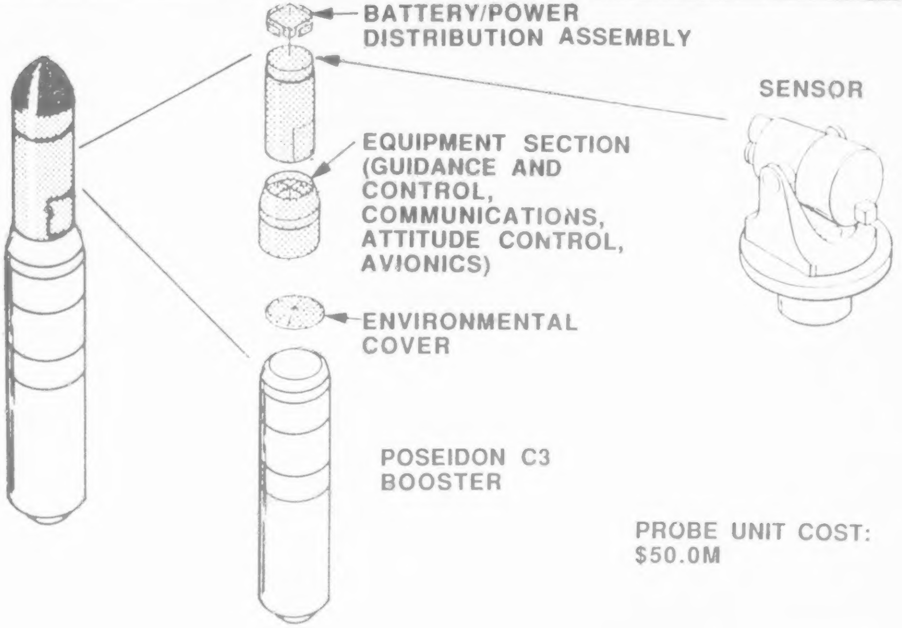
These missiles do not have to be in silos. They could be on a pad with a butler building over the top of them. But we based them in silos because it is cheaper.

PROBE/RADAR DUAL-PHENOMENOLOGY DISCRIMINATION

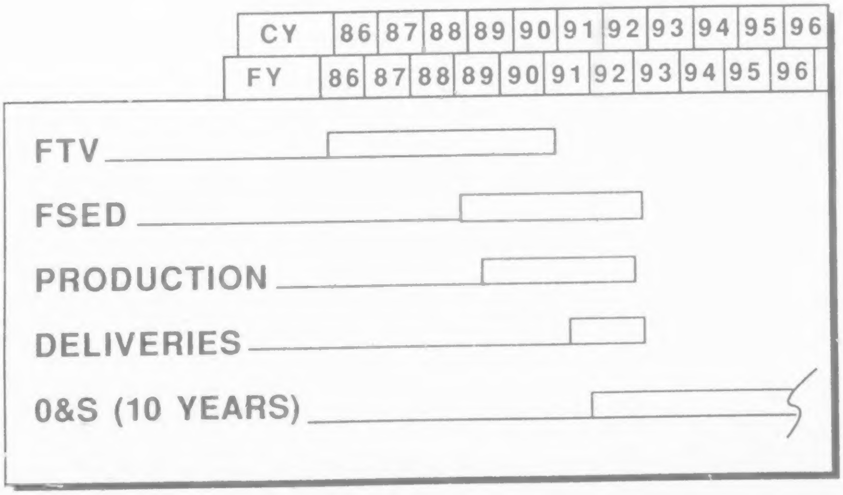


An LWIR probe working with the ground-based radar would provide dual-phenomenology inputs for greatly-improved discrimination. It is very difficult to defeat two separate wavebands discrimination. The 25 credible objects that I told you about would be drastically reduced if you had both LWIR probe and GBSDs radar working in concert.

LWIR PROBE CONFIGURATION


BATTERY/POWER DISTRIBUTION ASSEMBLY
SENSOR
EQUIPMENT SECTION (GUIDANCE AND CONTROL, COMMUNICATIONS, ATTITUDE CONTROL, AVIONICS)
ENVIRONMENTAL COVER
POSEIDON C3 BOOSTER
PROBE UNIT COST: $50.0M

ALPS MASTER SCHEDULE



Now I would like to talk about what we have looked at in terms of schedule and cost for a treaty-limited system. This very aggressive schedule may be unrealistic because it assumes a go-ahead in fiscal year 1989. This schedule is much like a Delta 180 or Delta 181 kind of activity. One would convert the present ERIS FTV program, add more flights to it, go into full-scale development, and make a production decision in the 1989 timeframe.

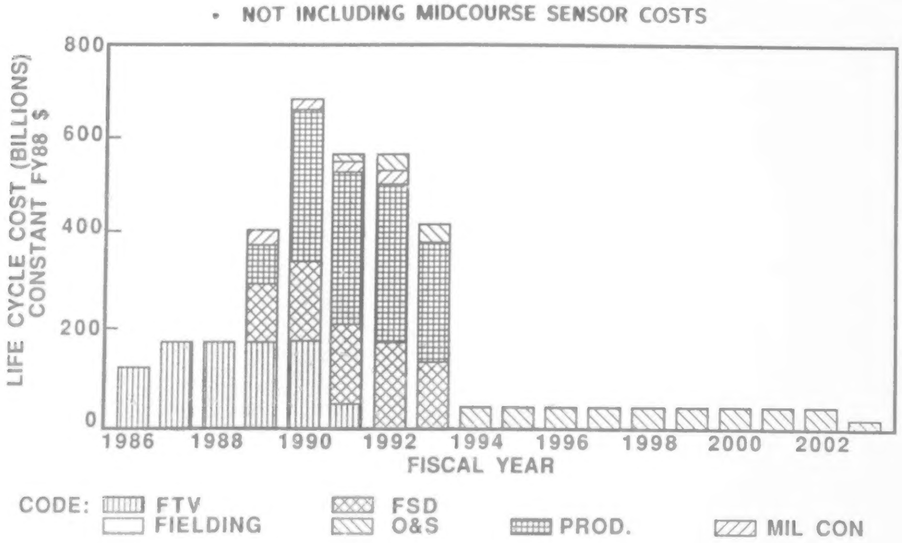
One could deploy such a system early in 1992, late 1991 if one so desired. If contract go-ahead was delayed until 1990 or 1991, a year-to-year slip in deployment would occur.

ALPS INTERCEPTOR LIFE CYCLE COST

LIFE CYCLE COSTS	CONSTANT FY88 $M
FTV	$ 855.7
FSD	775.4
PRODUCTION	1,299.8
MILITARY CONSTRUCTION	79.4
O&S	511.7
TOTAL	$ 3,522.0

Mr. Loomis. We have looked at life cycle costs for the interceptor in some detail. In fiscal year 1988 dollars 100-ERIS type ALPS interceptors, (not ERIS) would cost $3.5 billion, which I think compares with what Mr. Hofferth was saying. This is a 10-year life cycle cost, and I believe conservative. We in fact even added a management reserve.

ALPS LIFE CYCLE COST



Senator EXON. That is in current-year dollars, I presume?

Mr. LOOMIS. That was in constant fiscal year 1988 dollars. We have looked at the funding profile for this aggressive program; it peaks at about $700 million per year in the 1990 timeframe. Obviously if one wanted to slow down the program, one could minimize the peak funding.

SUMMARY LIFE CYCLE COST

	CONSTANT FY88 $B
• ERIS INTERCEPTOR (100)	3.5
• LWIR PROBE (3)	0.9
• NEW ABM RADAR (1)	0.5
TOTAL	4.9

We have looked at a summary life cycle cost for the three elements that we are talking about, and as I mentioned $3.5 billion for the interceptor, roughly $1 billion for the three LWIR probes, which again are pretty much state-of-the-art technology. As a matter of fact, the HOE tracker or sensor that we used on HOE could be utilized probably for near-term deployment. And we priced a new ABM radar.

MODIFIED TREATY OPTION

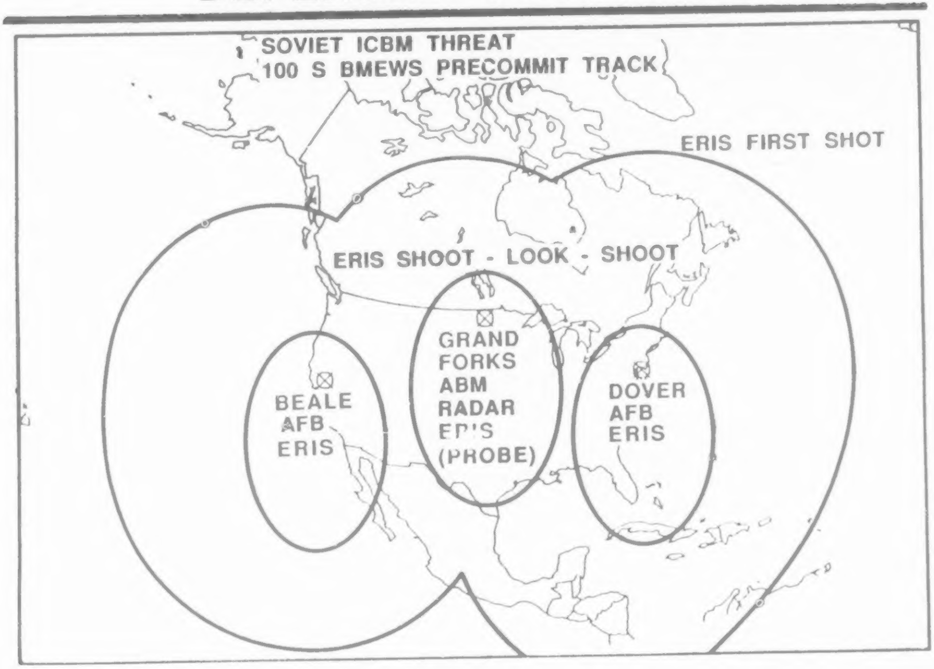
- UNAUTHORIZED LAUNCH (TYPHOON) REQUIRES APPROXIMATELY 200 INTERCEPTORS
- THREE SITES DESIRED FOR SHOOT-LOOK-SHOOT CAPABILITY AND SHORT RANGE SLBM
- A THREE-SITE COMBINATION OF ERIS/HEDI WILL PROVIDE A "ROBUST" ALPS

Now I would like to move to the next chart, which talks about a modified treaty option. What I told you about was strictly 100 ERIS interceptors based at Grand Forks, a system capable of defending against ICBMs and most SLBMs.

On the other hand, if you are worried about the unauthorized launch, the worst case being a Typhoon, you would require approximately 200 interceptors, depending on the mix of ERIS and HEDI.

A minimum of three sites would be preferred for a shoot-look-shoot capability to reduce the leakage. When you enforce shoot-look-shoot, whether it be with an ERIS or an ERIS–HEDI combination, you can get down to below 1 percent leakage. One in a thousand would leak through the system. The three-site combination would provide a very robust system and lay the groundwork for whatever options the country might want.

MODIFIED TREATY OPTION — DEFENDED FOOTPRINTS


SOVIET ICBM THREAT
100 S BMEWS PRECOMMIT TRACK
ERIS FIRST SHOT
ERIS SHOOT - LOOK - SHOOT
GRAND FORKS ABM RADAR ERIS (PROBE)
BEALE AFB ERIS
DOVER AFB ERIS

This shows a three-site defended area footprint. We arbitrarily picked Grand Forks, Dover, and Beale as the three sites to deploy more ERISs. This defended footprint is based on very conservative, 16,000-foot-per-second interceptor. You can see this second shot does not defend all the country. The way to do that, of course, is to increase the velocity of the booster so one could defend the whole country with a second shoot-look-shoot mode.

SUMMARY

- ERIS DEPLOYED AT GRAND FORKS PROVIDES COMPLETE CONUS COVERAGE FOR ICBMs AND LONG RANGE SLBMs
- THREE SITES (ERIS/HEDI) REQUIRED FOR SHORT RANGE SLBMs AND SHOOT-LOOK-SHOOT CAPABILITY
- EXISTING WARNING RADARS (WITH AUTHORIZED UPGRADES) AND EARLY WARNING SATELLITES ARE ADEQUATE FOR WARNING AND CUEING
- ONE NEW ABM RADAR (GRAND FORKS) PROVIDES HANDOVER FOR ALL ERIS INTERCEPTORS
- LWIR PROBE ADJUNCT ENHANCES DISCRIMINATION EFFECTIVENESS OF SYSTEM
- BATTLE MANAGEMENT/C ^{3} APPEARS VERY FEASIBLE

ERIS deployed at Grand Forks provides complete coverage for ICBMs and long-range SLBMs. For short-range SLBMs three sites and a combination of ERIS-HEDI are required.

The existing radars, with authorized upgrades, and the early warning satellites are adequate to provide warning and cueing for an ERIS ALPS interceptor. We recommend one new ABM radar to provide the hand-over necessary for ERIS to conduct its engagement.

We also recommend an LWIR probe to enhance the discrimination and to provide more robustness in terms of growth, against threats that might come about. In spite of all the rhetoric about how difficult it is for a battle management C^3 for this system, and even for the modified treaty system, we believe it is very, very feasible, in fact, almost in place today.

Thank you.

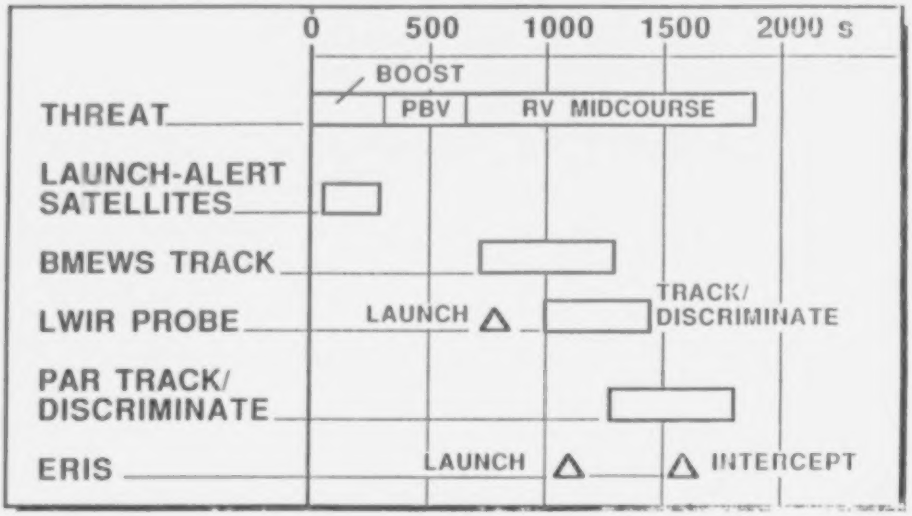
Senator EXON. Thank you very much. I have a series of questions, some of which we will likely ask you to respond for the record to save some time.

Would one of you state for the record—and if you all agree it is not necessary for you all to comment—who and where is the man in the loop in the scenario you are talking about this morning? I mean, if we detect a submarine launch or a launch made somewhere, I would guess that there must be some kind of a scenario to make an early determination of whether this is a forerunner of something big or an accident.

Since you are not talking about retaliation here, it is a defense maneuver strictly to destroy something that is coming in at you. In this scenario, would the President have to be contacted or who in the command and control structure, who gives and how soon would they have to give the order to launch, whatever system we eventually go to.

Mr. LOOMIS. I would like to comment on that if I may, Dean, since ERIS would, for ICBMs, be the one that needs the most time and the shortest response.

THREAT TRACK/INTERCEPT TIMELINE



We have looked at the timelines that go with such a system, in all cases we are asking for confirmation from at least two different sensors—I mean, the early warning satellite and a second early warning system, whether it be PAVE PAWS or BMEWS.

So after we get confirmation, we launch a probe, before we ever launch an ERIS interceptor.

As you can see from this timeline here, our first launch would be roughly about 1,100 seconds. There most definitely has to be a man in the loop. I would presume you have looked into this more than I have. Somebody at Cheyenne Mountain would be in the loop to make the decision as to whether this was a real threat before launching anything. But I would submit that 1,100 seconds is a sufficient amount of time.

I think there have been questions raised, such as "well, so you launch your interceptor, if it turns out not to be a real threat? What do you do? Well, there is no reason why we cannot have an encrypted destruct system on board, just like we do at our test range, and blow up that interceptor. Remember, we are nonnuclear, so nuclear material, would not be released.

Senator EXON. So that decision would be made by some command authority at Cheyenne Mountain?

Mr. LOOMIS. That is what we would think.

Mr. **Fisher**. Presumably it is a nonnuclear interceptor. Our best guess, and this ultimately would be decided by somebody else I am sure, but CINC/Space Command would be the logical place to have launch authority, he is resident right there where the information is coming in. He gets that information typically within a couple of minutes. So he has a lot of time to make up his mind.

Senator **Exon**. Thank you. Any further comments in that area? I will go on to some other questions that I have.

EARLY WARNING RADARS

I would like to ask this of both the contractor witnesses. What modifications are necessary at U.S. early warning radars, especially at Thule, and what ABM Treaty compliance issues, if any, would those modifications raise?

Mr. **Loomis**. For the modifications, we are talking about those that are in the present plan. As a matter of fact, Thule is pretty much on line now.

EARLY WARNING SYSTEM

- EARLY WARNING RADARS (CUE DEFENSE)
  - BMEWS I (THULE) – BMEWS PHASED ARRAY UPGRADE OPERATIONAL IN 1987
    ACTIVATE ALL OPTIONAL ELEMENTS
  - BMEWS III (FLYLINGDALE) – BMEWS PHASED ARRAY UPGRADE PLANNED FOR 1991
    ACTIVATE ALL OPTIONAL ELEMENTS
  - BMEWS II (CLEAR) – BMEWS PHASED ARRAY UPGRADE NOT PRESENTLY PLANNED
    UPGRADE TO SAME CAPABILITIES AS THULE
  - PAVE PAWS – BOTH SITES CURRENTLY OPERATIONAL PHASED ARRAY RADARS (WEST – BEALE / EAST – OTIS)
    ACTIVATE ALL OPTIONAL ELEMENTS
    UPGRADE SOFTWARE
- EARLY WARNING SATELLITE

We would like to activate the optional elements that are already in that radar in order to increase its range to get better, longer-range early warning data to support the time line that we were talking about before.

We recommend doing pretty much the same thing in Fylingdale as well as Clear. I do not believe the Clear radar upgrades are in the present budget, but would be the same as well as upgrading some of the software at PAVE PAWS.

Now, there is an option: and that is if one elected to go with an LWIR probe, then one could probably get by without any upgrades to the radar at all.

Mr. **Fisher**. Let me clarify that a little bit. You asked about the treaty. We are not asking for a different function out of those radars than they currently provide, so we feel very strongly that it remains strictly ABM Treaty compliant. It is just an early warning radar. We are attempting to get a little earlier information on the early warning. The battle management function is performed by the new ABM radar at Grand Forks.

Senator EXON. What kind of radar are you thinking about or proposing for North Dakota, briefly, and describe it to us briefly if you can? And what would the cost be? I assume that cost was included in the various costs that you gave us, Mr. Hofferth, in your original presentation that included the radar? Right?

Mr. HOFFERTH. Yes.

Mr. EXON. Can you just fill in some of the details on that a little bit?

Mr. HOFFERTH. The radar that I talked about in my presentation I presume to be the X-band radar that is being developed right now by the Army at Huntsville. We have, as I said, obtained costs from Raytheon for a replication of that radar and then getting through the development program and producing one for Grand Forks. I believe it would be on the order of $175 million.

Now the L-band radar that Bill talked about was a three phased-array radar.

Mr. LOOMIS. It would just be a three-phased version of the radar that is the L-band radar at COBRA DANE now. X-band that is developed and is available certainly has more discrimination capability than would the L-band. So, either one.

Senator EXON. I guess this would be best directed at the Lockheed people.

How do you plan to discriminate RVs from decoys using infrared and so forth, which might be easily manipulated by selection of construction and surface materials and so forth? How would you deal with simple chaff and other combinations, clouds obscuring the RVs and other decoys and things of that nature?

Mr. LOOMIS. Well, I cannot answer that in any real detail in an unclassified meeting. However, I might add that things like chaff and all the simple aerosols and all the simple decoys that people dream up and calculate on the back of an envelope, what test data are available do not work. LWIR very nicely discriminates against those kinds of things.

On the other hand, if you are talking about more advanced penetration aids that people postulate, the combination of that X-band or L-band radar with an LWIR system is a very, very powerful system. One can do certain things and supplement the weaknesses that the other one has. To go any farther we would have to go into classified session.

Senator EXON. I understand. That is as far as I would like to have you go.

Mr. HOFFERTH. If I could add to that, I think that is one of the strong points of having the two-layered system. Now Bill has talked about the two acquisition systems, but the point is if you had both acquisition systems there you would not use just LWIR data to launch ERIS or HEDI. You would use both of them in combination and gain a more powerful discrimination and track capability.

Senator EXON. Thank you, gentlemen.

SDI PROGRAM

Gentlemen, what are the elements of the ongoing SDI program that basically support your proposed defensive systems? And, if you care to, what are the major elements of the current and ongoing SDI programs that are omitted?

Mr. HOFFERTH. Let me start with that if I can. All the elements I have talked about—the HEDI, ERIS, the radar, TIR, the GSTS probe—while that program is not currently under contract it is in the proposal stage and award to be made. All of those elements are currently being worked and under development by the SDI program.

Mr. LOOMIS. I agree, and I think also that in terms of the discrimination issue, the Delta 181 really provided a tremendous amount of information which was very significant to someone who is involved in mid-course LWIR technology.

Senator EXON. Gentlemen, we have other questions that I think in the interest of saving your time and in deference to the next witness that we will submit to you for your prompt reply as soon as is convenient for the record and will be inserted in the record when they come back in.

I have learned a great deal this morning. I think that your presentation, your graphs and charts, and your responses have been right on point, and I thank you very much for your consideration. Is there anything in conclusion that any of you would like to add?

Mr. HOFFERTH. I have nothing more.

Senator EXON. Mr Fisher, Mr. Loomis, Mr. Hofferth, thank you very much for being here, and you are excused.

We will now call our next panel, Dr. Anne Cahn. Welcome to you, Dr. Cahn. We appreciate very much your being here this morning. I would like to accept without objection your full statement, which will be included in the record. I would like to ask you to summarize in any fashion you see fit.

STATEMENT OF DR. ANNE H. CAHN, DIRECTOR, COMMITTEE FOR NATIONAL SECURITY

Dr. CAHN. Mr. Chairman, thank you very much for inviting me to testify today on the issue of an antiballistic missile system with the limited goal of protecting the United States against an accidental or unauthorized launch of nuclear-armed missiles aimed at our territory. I am the Director of the Committee for National Security, a nonpartisan educational organization composed of former senior government officials, scientists and civic leaders with experience in national security affairs. As such, I appreciate the opportunity to discuss our views with you.

Over the next few months the Armed Services Committee and indeed the Congress as a whole will face a number of very important questions concerning the proper direction of President Reagan's strategic defense initiative.

One of those questions concerns the extent to which the SDI research and development program should be directed toward engineering development of a new generation of ground-based missile interceptors with a view toward deploying what Senator Nunn has termed an accidental launch protection system, ALPS, in the early 1990s.

A few weeks ago I went on record with a critique of ALPS that was printed in Defense News and I have attached a copy of that article to this statement. Having written my doctoral dissertation entitled "Eggheads and Warheads" on the role of scientists in the ABM debate of the late 1960s, the proposal to move toward deployment of an antimissile system with such a very limited strategic role brought to my mind the Johnson administration's arguments for an ABM deployment when it undertook to deploy a limited Sentinel system.

In September 1967, Secretary of Defense Robert McNamara delivered a now-famous speech in which he gave a forceful critique of the then-current infatuation with missile defense. At the end of his speech, however, Secretary McNamara nonetheless added an announcement that the Johnson administration would pursue a limited ABM system designed not against the large Soviet attack, but against the much smaller prospective missile threat from China.

It seems clear in retrospect that the decision to pursue such a limited system despite McNamara's skepticism was motivated primarily by political considerations. The case for designing a system against the Chinese stretched credibility. Nonetheless, given Soviet deployment of an ABM system, the political price of failing to respond in a like manner was apparently too high for the Johnson administration to bear.

I am afraid that I read Senator Nunn's recent speech in which he proposed consideration of an accidental launch protection system in much the same light. In response, I felt compelled to express the doubts that I and many members of the Committee for National Security have about the value of a limited missile defense system of any kind. But before I go on to these problems I want to emphasize that the committee's possible differences with Senator Nunn on the question of ALPS are, compared to our agreement on every other issue he raised in his speech, exceedingly minor.

Indeed, even on the question of ALPS, I should note that the Senator's proposal was worded very carefully, citing defense against accidental or unauthorized missile launches as only a possibility that should be further explored.

In fact I would go so far as to say that CNS agreed with 99.44 percent of what Senator Nunn said concerning the direction of the Strategic Defense Initiative and the relationship between SDI and arms control. We hope, therefore, that whatever your committee and the Congress as a whole decide to do about ALPS it will be possible to make reasonable progress this year toward a consensus on a reasonable SDI research program along the lines that Senator Nunn laid out.

In my written testimony I spell out what that consensus consists of, but let me go on here to discuss the 0.56 percent of disagreement that CNS and I may have with Senator Nunn. Actually, even when it comes to development of technologies that would be potential candidates for an ALPS, I am not sure that there is a great deal of difference between us.

SDI should carry on planned technology demonstration and validation tests of Lockheed's ERIS and of McDonnell-Douglas' HEDI.

It should also continue with advanced technology development of smaller, less expensive versions of these interceptor missiles for demonstration in the 1990s.

The best case that can be made for full-scale engineering development and limited deployment of ERIS or of ERIS plus HEDI, however, seems to us unpersuasive. As we read it, the reasons given for such a limited deployment run something like this.

First, a treaty-compliant deployment of 100 interceptors at a single site would essentially match the Soviet deployment of an ABM system around Moscow.

Second, it would give the United States comparable operational experience with a deployed ABM system.

Third, it would establish a hot production line for ABM components.

Fourth, it would, therefore, provide a hedge against a Soviet effort to break out of the ABM Treaty with deployment of a nationwide ABM system using traditional ABM technologies.

And last, it might also offer some protection of at least part of the country against some accidental or unauthorized launches of missiles aimed at U.S. territory.

We agree that a principal reason of carrying on a significant ERIS and HEDI technology development program is to provide a hedge against a Soviet breakout from the ABM Treaty. Such a Soviet breakout effort, however, does not appear to be an imminent threat. There has recently been a spate of stories in the rabid anti-arms control press raising alarms about Soviet radar programs that, it is alleged, constitute the key long-lead elements of a nationwide Soviet ABM deployment.

CNS staff recently investigated these and other alarmist claims about Soviet missile defense programs for an article published in the current issue of Foreign Policy magazine. I would be happy to provide a copy to you and other members of the committee if you are interested. There is nothing new in recent charges that the Soviets are or may be preparing to deploy a nationwide missile defense, and all such arguments have proved to be grossly exaggerated.

Senator EXON. Dr. Cahn, right here before I forget, I think it might be helpful if you would provide that, and we would be glad to put it in the record.

Dr. CAHN. I would be happy to.

[The information referred to follows:]

FOREIGN POLICY No. 70
(Spring 1988).

ASSESSING SOVIET STRATEGIC DEFENSE

by Stephen Daggett and Robert D. English

In the weeks preceding Soviet leader Mikhail Gorbachev's December 1987 visit to Washington, President Ronald Reagan went out of his way to reassure conservative supporters that he would not accept a strategic arms control agreement that would curb the U.S. Strategic Defense Initiative (SDI), the planned space-based missile defense system popularly known as "Star Wars." In defense of an unconstrained SDI, Reagan referred to the Soviet version of Star Wars as a "Red Shield." He asserted on November 23, 1987, that the USSR has spent the equivalent of "billions upon billions of dollars" on an effort that "dwarfs our SDI."

The Washington summit meeting was generally judged a success, but it did not resolve the most critical issue in arms control: The USSR still wants limits on SDI and the Reagan administration still refuses. The success or failure of Reagan's return visit to Moscow in 1988, therefore, will hinge on achieving a breakthrough on SDI.

So the specter of the Red Shield seems certain to haunt future U.S. debate about strategic defense. If, as appears likely, SDI remains a stumbling block to a strategic arms treaty, then the Reagan administration and its supporters will feel more compelled to cite Soviet missile defense efforts as a rationale for the American program. Alternatively, if the Soviets temporarily settle for an ambiguous resolution of the issue, hoping that Congress will restrict SDI, then SDI advocates will see a need to keep pace with a Soviet program able to exploit the ambiguity. In either case, two questions will become more urgent: Is the Soviet version of SDI as threatening as the Reagan administration maintains? And to what extent should the American SDI be driven by concerns about Soviet missile defense initiatives?

Prior to Reagan's announcement of the SDI in March 1983, U.S. defense and intelligence analysts generally held that Soviet strategic defense efforts did not pose an imminent security threat. But beginning in February 1984, when SDI budget requests were first submitted to Congress, the administration swiftly concocted an alarming picture of Soviet strategic defense activities. When the Pentagon claimed that the United States needed a decade of intense effort just to catch up, the issue became clear—the "Star Wars gap."

Two allegations quickly emerged—that the Soviets might be preparing to "break out" of the Antiballistic Missile (ABM) Treaty of 1972 by deploying a nationwide ABM system, and that their programs in lasers and other exotic weapons could permit them to beat America to a breakthrough in advanced missile defenses.

In fact, a review of the available evidence, from both official and unofficial sources, shows that the administration's treatment of this issue has been unbalanced and misleading. Although the Soviets have been working hard on many aspects of strategic defense, there is little basis for the fear that they will break out of the ABM treaty, and it is the United States that leads in the advanced technologies of interest for missile defense. Significantly, intelligence community assessments support these judgments, but information provided to the public and to Congress has been highly selective and one-sided.

A review of the Reagan administration's handling of this issue, therefore, highlights some important problems in the process by which the U.S. government interprets and communicates to the public threats to national security.

The ABM treaty, signed by the United States and the Soviet Union in May 1972 and amended by protocol in July 1974, prohibits nationwide missile defense. Each side is allowed to deploy an antimissile system at only one site having no more than 100 interceptor rockets. (The Soviets have continued to operate their one permitted ABM system around Moscow. The United States dismantled its only facility around Grand Forks, North Dakota, in 1976.) These limits are reinforced by provisions designed to ensure that neither side can break out of the agreement—that is, deploy a nationwide missile defense so rapidly

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STEPHEN DAGGETT *is a senior analyst at the Committee for National Security.* ROBERT D. ENGLISH, *previously a senior analyst at the Committee for National Security, is now a Ph.D. candidate in the department of politics at Princeton University.*

that the other side could not respond in a timely fashion.

Although in the past the United States has questioned Soviet compliance with some provisions of the ABM treaty, no previous administration ever accused the Soviets of systematically preparing to circumvent the agreement. Even the 1983 edition of *Soviet Military Power*, the Pentagon's annual review of the threat, devoted just two paragraphs to improvements in Soviet radars for early warning of missile attack and two more paragraphs to improvements in the Moscow ABM system. There was no mention of an ABM breakout potential.

After 1983, however, the Reagan administration fundamentally revised its assessment. The 1984 edition of *Soviet Military Power* claimed that Moscow could deploy a nationwide ABM network within a decade. And in February 1985 the president's report to Congress on Soviet noncompliance with arms control agreements formally charged that "the USSR may be preparing an ABM defense of its national territory."[1] This allegation suggested that the Soviets were in the process of abandoning perhaps the most fundamental arms control measure of the nuclear age, the ABM treaty. But this alarming conclusion did not rest on any single, unambiguous piece of evidence. Rather, as the Defense and State departments put it in an October 1985 report, *Soviet Strategic Defense Programs*, "Taken together, all of the Soviet Union's ABM and ABM-related activities are more significant—and more ominous—than any one considered individually."

The basic premise of the "breakout" argument is that the Soviets have put in place the basic elements of a future nationwide ABM infrastructure in constructing a network of new, large, phased-array, or electronically aimed, radars. According to the administration, other ABM components—including smaller, "mobile" radars and new ground-based interceptor missiles—could be rapidly deployed, perhaps supplemented by air defense, or antiaircraft, missiles upgraded to have some ABM capability.

Thus the greatest significance has been attributed to construction of large phased-array radars.

By 1983 the United States had identified five new radars under construction along the borders of the Soviet Union, the first of them at Pechora in northern Russia. Because these radars were located on the country's periphery and were oriented outward, they were permitted by the ABM treaty.

Then, in early 1983, the United States identified the sixth Pechora-class radar under construction near the town of Krasnoyarsk in central Siberia—some 750 kilometers from the nearest border with Mongolia and oriented to the northeast, toward the Bering Sea. The ABM treaty prohibits such radars in a country's interior except for space tracking and verification, and it is generally agreed that the Krasnoyarsk radar is not well designed or located for these purposes.

In March 1984 the Pentagon presented an alarming assessment of the potential function of the new radars. Earlier, official statements had described the Pechora-class phased-array radars as "early warning" radars, designed simply to detect a missile attack at long range. But then the defense intelligence agencies concluded that the complete network of Pechora-class radars, along with other radars for early warning and for the Moscow ABM system, "could provide target tracking data for ABM deployments beyond Moscow."

In effect the Pentagon began arguing that the new large radars could perform a battle management function in ballistic missile defense. Indeed, some officials claimed that the location of the Krasnoyarsk radar was especially adapted to battle management because the radar might be useful in defending nearby missile fields and could be protected from nuclear attack more easily than sites on the border.

In elaborating its argument, the administration claimed that the battle management function could be shared with smaller ABM radars that could be easily deployed. Development, testing, and deployment of mobile ABM radars are prohibited by the ABM treaty. But according to the administration, the Soviets developed and tested radars in the 1970s that could be dismantled, moved, and redeployed relatively quickly. These small radars, named "Flat Twin" and "Pawn Shop," allegedly could be integrated into a nationwide missile defense. The network of large phased-array radars would provide initial target-tracking data that would then be handed over to the smaller radars. The smaller radars then would acquire and track individual warheads, identifying them as targets for engagement radars and interceptor guidance radars deployed with ABM missile batteries. As the Pentagon explained: "The Soviets have developed [a] rapidly deployable ABM system for which sites could be built in months instead of years. . . . The Soviets seem to have placed themselves in a position to field relatively quickly a nationwide ABM system should they choose to do so."

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[1] *U.S. Department of State, Bureau of Public Affairs,* Soviet Noncompliance with Arms Control Agreements *(Washington, D.C., February 1985)*, 2.

The administration also argued that Soviet air defenses could be upgraded to provide another layer of defense against ballistic missiles. In recent reports on treaty noncompliance, the administration has cited Soviet testing of air defense radars concurrently with ABM tests as an activity it considers a "probable" treaty violation. The administration also claims that new Soviet air defense missiles, particularly the SA-12B ("Giant"), an upgraded version of the widely deployed SA-12A, may have "capabilities to intercept some types of strategic ballistic missile [warheads]."

For the Defense Department, these developments collectively offer overwhelming evidence of an impending Soviet breakout. In March 1987, after the discovery of three additional Pechora-class radars in the western USSR, all located on the country's periphery and permitted by treaty, the Pentagon proposed that the president's next noncompliance report be strengthened to include that the Soviet Union "is"—rather than "may be"—preparing a nationwide missile defense. The State Department and the CIA objected, and the 1987 noncompliance report stuck to "may be."

It turns out that the Defense Department's analysis rests on very shaky ground, as a U.S. congressional delegation's September 1987 visit to the Krasnoyarsk site helped establish. On the one hand, the visit further undermined the official Soviet explanation for the radar—that it is designed for tracking satellites in space and is therefore permitted by the ABM treaty. Members of the delegation confirmed, and some Soviet officials acknowledged, that the radar is not designed for space surveillance. On the other hand, the visit also undermined the official U.S. suspicion of the radar's purpose. The defense electronics expert Anthony Battista, then a House Armed Services Committee staff member who accompanied the delegation, found that the radar did not have properties necessary to function effectively in ballistic missile defense battle management.

In fact, and most significant, in reaching these judgments the congressional delegation merely echoed conclusions reached several years ago by internal government intelligence assessments. According to press accounts, a classified CIA report circulated within the administration in summer 1984 concluded explicitly that the Krasnoyarsk radar—and by implication, the other Pechora-class radars—was "not well designed" to serve an ABM function. The CIA report cited the radar's low frequency (that is, long wavelength), its susceptibility to blackout in a nuclear environment, its vulnerability to direct attack, and its location. The congressional visit confirmed that the radar was designed to operate at a low frequency and emphasized the shoddy, unhardened construction of the radar buildings.

Perhaps the most important technical limitation of the Pechora-class radars is their operation at low frequencies. Low-frequency radars have the advantage of being able to detect missile warheads at a relatively long range for a given power output. But long-wavelength radar beams do not provide precise data on the course of individual warheads. In addition, the electromagnetic pulse caused by nuclear explosions in the upper atmosphere can cause a blackout of these radars. Battle management radars for missile defense, therefore, operate at much higher frequencies (or shorter wavelengths). Low-frequency radars like that at Krasnoyarsk are used for early warning of missile attack.

The CIA report also concluded that the location and orientation of the Krasnoyarsk radar are not appropriate for defense of nearby silo fields. Krasnoyarsk lies some 350 kilometers east of missile bases in Soviet central Asia, and the radar is directed toward the northeast. But the bulk of U.S. warheads aimed at the Soviet missile bases would come over the North Pole and, in the future, from Trident submarines in the Indian Ocean—not in great numbers from the Bering Sea. Finally, as CIA officials explained to Congress in June 1985: "These radars . . . are large fixed installations, vulnerable to direct attack. There will always be an issue of whether an ABM system is worth having which depends to a great extent on a few, potentially quite vulnerable facilities."

To be sure, the Krasnoyarsk radar apparently will violate the ABM treaty once it is completed. It can be legitimately wondered why the Soviets would risk violating the ABM agreement to build a facility of such limited military significance. One answer may be that the Krasnoyarsk site fills a gap in early warning radar coverage that otherwise could be closed only with two similarly expensive facilities operating in much less accessible areas and in an inhospitable climate.

The fact remains that the Pechora-class radars suffer from damning technical limitations in performing any part of a battle management function. Thus it is extremely doubtful that the smaller, supposedly mobile Flat Twin and Pawn Shop radars could perform adequately with information from the early warning radars. By comparison, the new Moscow ABM system employs a huge high-frequency battle management radar to absorb information from the early warning network and then hand on assignments to missile batteries. But even its effectiveness is open to question. According to Lawrence Woodruff, deputy undersecretary of defense for strategic and theater nuclear forces: "The Soviets have been developing their Moscow defenses for over 10 years at a cost of billions of dollars. For much less expense we believe we can still penetrate these defenses with a small number of Minuteman missiles equipped with highly effective chaff and decoys." Obviously, a jury-rigged system of Flat Twin and Pawn Shop radars would be even less effective at stopping U.S. nuclear warheads.

It is doubtful that the Soviets are even in a position to deploy Flat Twin and Pawn Shop. These radars were tested only a few times in the 1970s. All but two of the test radars were dismantled by 1987, prompting speculation that the Soviets decided the system was ineffective. Later in 1987, U.S. intelligence discovered some components of the dismantled radars at a Soviet electronics plant near Gomel in Byelorussia. In December 1987 the annual White House report on Soviet noncompliance with arms control treaties

cited their presence at Gomel as a violation of the ABM treaty. It appears, however, that the radars are not operational.

The remaining charge—that the Soviets have violated the ABM treaty by testing air defense systems "in an ABM mode" and that they could upgrade air defenses—is equally dubious. Indeed, the principal compliance issues already have been resolved to U.S. satisfaction. In 1978 the two sides reached an agreement defining testing in an ABM mode with respect to air defense missiles. The United States has never claimed that Soviet missile tests since that time have violated this agreement. In 1983 the Soviets also agreed to cease operation of air defense radars during ABM tests, and in 1985 a formal agreement on this point was signed.

Meanwhile, the most capable Soviet air defense missile, the SA-12B, has been tested only against short-range "tactical" missiles. In those tests, it succeeded in just 1 out of about 20 attempted intercepts. Even if it could destroy short-range missiles reliably, which it apparently cannot, it could not necessarily be used effectively against U.S. strategic ballistic missiles. Warheads from the current U.S. Trident I (C-4) submarine-launched missile—with a 7,400-kilometer range—re-enter the atmosphere at more than twice the velocity of the 900-kilometer-range Soviet SS-12 missile against which the SA-12 has been tested.

It remains possible that the Soviets could deploy a nationwide missile defense based on the Moscow ABM system. Indeed, the Soviets have recently invested in improving the Moscow system, constructing a huge new battle management radar in the suburb of Pushkino and deploying improved Galosh and new Gazelle interceptor missiles. But Pentagon officials admit that this system, when operational, will at best approximate the limited capability of the U.S. "Safeguard" system, which was deactivated in 1976 because of its cost and ineffectiveness. The Soviets began these upgrades in 1978, and the Pentagon predicted that they would be completed in 1987. Now the Pentagon says that the system will be finished in the "late 1980s." Thus it will have taken the Soviets at least 10 years to deploy about 100 interceptors, a pace that hardly foreshadows the rapid deployment of a nationwide ABM system. Taken in combination, the evidence that the Soviets may be preparing to break out of the ABM treaty is highly selective, one-sided, and, when subjected to even limited scrutiny, unconvincing.

Soviet Directed-Energy Weapons

The second principal theme in the administration's portrayal of the Soviet strategic defense threat concerns Soviet efforts to develop futuristic directed-energy weapons, including lasers and particle beams. Before 1984, U.S. defense and intelligence agencies generally played down Soviet directed-energy weapons. A handful of disaffected intelligence officials and a few senators persistently warned of Soviet advances in particle beam missile defenses or laser antisatellite (ASAT) weapons. But in general, leading defense officials were singularly unimpressed.

For example, in 1977 the trade journal *Aviation Week and Space Technology* published a series of articles warning that the Soviets had made dramatic breakthroughs in particle beam weaponry and could deploy weapons that would "neutralize this country's strategic missiles" by 1980. The source of these stories was Major General George Keegan, the former head of air force intelligence, who retired and went public with his alarms after losing a debate on the issue within the intelligence community.

Keegan believed that the Soviets had developed massive power generators driven by underground nuclear explosions, that the generators were designed to drive proton beam accelerators, that such proton beams could penetrate the atmosphere efficiently, and that ground-based particle beam weapons could operate effectively against incoming missile warheads. It would have been remarkable if any of these worst-case projections had turned out to be correct. In fact, none of them did, and no weapons of the sort Keegan predicted ever materialized. Ironically, it was Lieutenant General Daniel Graham, now a prominent SDI advocate but then recently retired as director of the Defense Intelligence Agency, who best described the problem with Keegan's thesis: "One worst case analysis may be right, but something that depends on a whole group of them never is."

The underlying debate, however, continued in part because officials believed that the Soviets were investing much more heavily than the United States in particle beam development and some other directed-energy technologies. The Soviets, for example, persisted longer than the United States in using particle beams in attempts to generate fusion energy. The Defense Department explained in February 1982 that "the Soviet effort is judged to be larger than that of the United States (particularly in the area of accelerators for fusion applications), and to have been in progress longer. However, no direct correlation between Soviet particle beam work and weapons-related work has been established."

It was always discomforting for defense officials to explain to congressional critics why the Soviets continued working hard in an area that the United States has found unpromising. In this case the discomfort was all the greater when it came to other directed-energy devices, especially high-energy lasers, for which weapons applications were much closer. In 1979 William Perry, then undersecretary of defense for research and engineering, said that the USSR's directed-energy program "may be three to five times the scope of our own," costing up to $1 billion, compared with the $200 million U.S. expenditure. The size of their commitment, according to Perry, implied that the Soviets could build prototypes of directed-energy weapons fairly soon. Nevertheless, he defended the U.S. decision not to pursue early development of laser weapons.

J. Richard Airey, director of the Pentagon's Directed Energy Technology Office, was more blunt, telling a congressional hearing on lasers in December 1979: "We . . . have decided to keep our high energy laser program as a technology program for the next few years. We believe that we understand the technical issues basic to translating high energy laser technology into weapons systems, that our decision is correct, and that the Soviets may be moving prematurely to weapons systems." Throughout the 1970s, each of the military services carried on programs to explore directed-energy technologies, primarily for tactical applications. However, none of the programs demonstrated that directed-energy weapons could accomplish anything that conventional weapons could not do more easily. The air force, for example, once put a powerful gas-dynamic laser in a modified transport plane and showed that it could shoot down target drones. Air-to-air missiles that do not fill up a large cargo airplane can do the same thing, however, and the Airborne Laser Laboratory was aptly compared to a "ten ton watch."

Taken in combination, the evidence that the Soviets may be preparing to break out of the ABM treaty is highly selective, one-sided, and, when subjected to even limited scrutiny, unconvincing.

Official coolness toward laser weaponry did not change when Reagan first came into office. The first edition of *Soviet Military Power*, published in 1981, did not even mention directed-energy weapons in its chapter on Soviet strategic defense. Rather, it focused on traditional ground-based ABM interceptors and on air defense. It discussed lasers briefly in a later chapter on new technology, but mainly in terms of "short-range ground-based applications, such as tactical air defense and anti-personnel weapons." In April 1982 the chief of air force research and development, Lieutenant General Kelley Burke, projected that the Soviets could launch a laser ASAT weapon within 5 years, but he also claimed that such a device would be less effective than the planned American F-15-launched ASAT missile and that an effective space-based laser ASAT would not be feasible before the late 1990s.

The administration's temperate view of Soviet progress in directed-energy weapons disappeared once SDI was established. After Reagan's March 1983 Star Wars speech, the Defense Department began to take more note of Soviet directed-energy programs. By 1984, discussion of directed-energy weapons for strategic defense in *Soviet Military Power* had tripled in length.

By the time the 1985 edition of the book was published, the chapter on strategic defense had been retitled "Strategic Defense and Space Programs," and a section on laser/energy weapons systems preceded any mention of traditional ABMs, air defense, or civil defense. In March of that year the CIA prepared a working paper entitled "Soviet Directed Energy Weapons—Perspectives on Strategic Defense" that was widely circulated both inside and outside the government. In June, State Department counselor Paul Nitze delivered a major speech in Chautauqua, New York, describing the Soviet SDI program. In October, the Defense and State departments released a glossy 27-page summary of Soviet strategic defense programs that illustrated Soviet research on lasers, particle beams, and other advanced technologies.

The CIA working paper is perhaps the most interesting of the administration's assessments because it provides the most detail on the Soviet research effort. The paper was drafted with a view to countering Soviet complaints about America's SDI program. It aspires to prove that the Soviets have been hypocritical in criticizing SDI because they have been engaged in parallel research into advanced missile defense technologies for at least as long as the United States has.

According to the paper, the Soviets have poured significantly more money into directed-energy weapons than the United States. Although the CIA declined to provide a dollar cost estimate, other administration sources cite the $1 billion per year figure for Soviet programs that Perry first used in 1979. The Soviet Union, the paper claims, has built more than six major directed-energy research facilities and test ranges and has an estimated 10,000 scientists and engineers associated with laser weapons research.

The CIA paper makes the following points:

- The Soviets "have conducted research into the three types of gas lasers that the U.S. considered promising for weapons applications: the gas-dynamic laser, the electric discharge laser, and the chemical laser. . . . Soviet achievements . . . are impressive. . . They have continued to work on certain types of lasers which the U.S. abandoned in favor of other, more attractive, short-wavelength lasers."
- Graphs show that the Soviets have achieved higher average power output than the United States in gas-dynamic and electric-discharge lasers, though the maximum output of Soviet chemical lasers lags by a factor of almost 10.
- The Soviets have been working on other lasers, including micron-wavelength lasers, that the United States has not considered seriously for weapons applications until recently.

- The Soviets are "aware of" the military potential of shorter-wavelength lasers and "are investigating" the excimer and free-electron lasers.
- The Soviets "dominate" literature on metal-vapor lasers and have published work on x-ray lasers.
- On the whole, Soviet laser technology is "on a par" with that of the United States.

The list seems impressive. Indeed, the paper follows these conclusions with alarming projections that the Soviets already have a ground-based laser that can interfere with U.S. satellites, that they will be able to test prototypes of a space-based ASAT laser in the late 1980s and begin operational deployments in the 1990s, and that they will be able to deploy laser weapons for missile defense after the year 2000.

Of course, if, as the CIA paper implies, the Soviet Union is on a par with the United States technologically and is pouring more resources into directed-energy weapons than the United States, a clear case can be made for a substantially larger U.S. effort. On every ground, however, the judgments in the CIA analysis—and in other official discussions—are open to question.

Estimates of Soviet resources devoted to directed-energy weapons are especially suspect. Although the CIA was reticent about supplying a dollar value for Soviet directed-energy weapons research, other agencies and officials have not been so shy—but the figure always cited is the same $1 billion per year estimate that Perry used almost a decade ago. Perhaps the Soviets have frozen their funding level—implying, by the way, that great progress in the technology has not occurred. More likely, the billion-dollar figure is an extremely rough estimate.

Moreover, the $1 billion annual price tag attached to Soviet laser research ignores the important qualification that most of the Soviet efforts are directed toward tactical and battlefield applications. By contrast, the U.S. laser effort is aimed overwhelmingly at strategic defense.

Other analyses of resource inputs may be only marginally more reliable. For example, estimates of the number of persons working on directed-energy weapons are usually derived from the floor space allocated to particular research organ-

izations. Such estimates say little about the actual nature of the work being performed.

Moreover, raw estimates of resources invested reveal nothing about the value of the research. There is no doubt that the United States is more efficient than the USSR in high-technology fields, and many analysts argue that estimating Soviet efforts in U.S. dollars tends to inflate the size of the Soviet program. The same is often true of human resources. Ten thousand Soviet scientists and engineers working on lasers is a lot of trained personnel. But the real productivity of professional labor can be surprisingly low, as the following account in the March 1985 issue of *Defense Systems Review* by an American engineer, Roger Main, suggests about activity at the new Soviet laser institute at Troitsk, which employs some 3,000 people:

> I asked one of the scientists working there why this enormous number of people was needed. His answer told the story: because virtually nothing which they need for their work is available "on the market," they will have to make everything in-house. Thus, most of these 3,000 will be involved in manufacturing even the simplest hardware items, which scientists in the West either buy from catalogs or have made by suppliers. Probably only ten percent of the total staff of this institute will be able to do actual productive scientific work, and that not at the pace they would like because of delays in obtaining needed items.

In judging the magnitude of Soviet efforts, what really counts is not resource inputs but product output. Although the Soviets have made a large investment in directed-energy technology, the lasers on which they have made the most progress are not useful for strategic defense applications. The gas-dynamic and electric-discharge lasers with which the Soviets have exceeded U.S. power levels are not promising because they operate at relatively long wavelengths—between 5 and 11 microns. These wavelengths generally do not penetrate the atmosphere efficiently and require impractically large focusing mirrors to deliver high-power beams over great distances. For these reasons, the United States has cut back its effort to develop gas-dynamic and electric-discharge lasers, even for tactical purposes.

Chemical lasers, especially hydrogen fluoride and deuterium fluoride lasers, may be more promising for weapons purposes because they may be able to deliver more energy to a distant field target. Nevertheless, because fuel requirements for these lasers are quite high, it would be expensive to base them in space, and excimer and free-electron lasers make better candidates for ground basing. According to the CIA paper, American chemical lasers exceed their Soviet counterparts in the average power generated by a factor of 10. More important, according to an April 1987 American Physical Society report, the largest U.S. experimental chemical laser—the MIRACL laser at White Sands Missile Range in New Mexico—has reached the power limit attainable with its relatively straightforward design, and high power output will require very advanced optics. Even though the United States leads in chemical lasers, the American SDI program has "downselected" chemical lasers as space-based "kill mechanisms" in the belief that ground-based excimer and free-electron lasers will prove much more promising. Chemical lasers may be useful eventually as ASAT weapons, but in this area the United States probably has a lead.

The CIA paper and other official statements provide only a partial and highly misleading description of Soviet directed-energy weapons activities.

The CIA discussion of micron-wavelength lasers may very likely refer to various types of iodine lasers. Iodine lasers produce a short wavelength of potential use in long-range weaponry. There has been speculation that the Soviets have developed high-powered iodine lasers. According to laser experts, current technologies for "pumping" iodine lasers cannot be scaled to high power levels. Generating high-power beams will require a new approach, such as the chemical oxygen-iodine laser (COIL). But according to the American Physical Society, the demonstrated power of COILs would have to be increased 100,000 times for weapons applications, and beam quality is uncertain. Thus weapons applications remain remote. Most of the other laser technologies noted by the CIA are equally far from fruition: Metal-vapor lasers are too inefficient for military applications, and x-ray laser development is barely beyond the theoretical stage.

According to the CIA, the Soviets have been exploring excimer and free-electron lasers. Very little information is available about their efforts in either area. For its part, the United States is investing more heavily than the Soviet Union in free-electron laser development: The SDI program plans to spend $1 billion to construct test lasers at White Sands over the next few years. The advantage of the free-electron laser is that output can be "tuned" to different frequencies, including very short wavelengths that can penetrate the atmosphere efficiently. According to a May 1985 analysis by Simon Kassel of the Rand Corporation, the Soviets in 1985 attained high free-electron laser power output, but they have not been able to generate the short wavelengths on which American development has centered. Of course, achieving high power at short wavelengths is precisely the challenge.

SDI's other exotic candidate for development is the excimer laser, which also operates at very short wavelengths and may penetrate the atmosphere efficiently. Then Director of the Pentagon's Defense Advanced Research Projects Agency Robert Cooper said in March 1984 that "we have some lead" over the Soviets in excimer lasers. In any case, the United States is putting a greater effort into developing free-electron lasers, treating excimers as a "back-up."

Any assessment of relative U.S.-Soviet standing in directed-energy weapons also must consider various supporting technologies critical to the successful operation and integration of a strategic defense system, including sensors, guidance, and battle management systems. Reviews of key military technologies published annually by the office of the undersecretary of defense for research and engineering show that the United States is significantly ahead in all of these technologies, including optics and computers.

Laser weapons require advanced precision optics—mirrors for generating, amplifying, and focusing the beam, and mirrors for directing a beam from a ground-based laser to space-based reflectors to the target. Official statements suggest that the Soviets excel in optics technology. Nitze observed in June 1985 that the Soviets were pursuing "related laser weapon technologies, such as . . . high-quality optical components." The Defense Department has written that the Soviets "have probably been developing optical systems necessary for laser weapons to track and attack their targets. They produced a 1.2-meter segmented mirror for an astrophysical telescope in 1978 and claimed that this reflector was a prototype for a 25-meter mirror." In 1976 the Soviets built the world's largest astronomical mirror, 6 meters in diameter. But unfortunately for the Soviets, their laboratories make low-quality mirrors. Their 6-meter Zelenchukskaya telescope mirror reportedly produces images inferior to those of American mirrors one-half its size.

In pressing its views so forcefully, the Reagan administration has compromised the independence of the intelligence process.

Also critical to laser development is computer technology. Computers constitute the brain directing a weapons system like SDI. The lightning speed at which a comprehensive strategic defense would have to perform means that computers will operate the sensors and the battle management, communications, fire control, kill assessment, and nearly every other subsystem.

But computer technology may be Moscow's greatest weakness. From supercomputers and minicomputers to software and microchips, the Soviets lag about 10 years behind the West. For example, American supercomputers reportedly can conduct up to 10 billion operations per second, whereas the best Soviet computers are 100 times less efficient, being able to complete only 100 million operations or less per second.

To be sure, not all Soviet weaponry suffers from obsolete computing. In many instances the Soviets make more effective use of their "middle tech" than the United States does of its high technology. Nevertheless, a comprehensive strategic defense cannot be built upon a limited computing capability. On the contrary, computer hardware and software have been the most critical and demanding elements of SDI. Indeed, if SDI's requirements exceed American technological capabilities, as many American experts argue, such requirements will prove far more daunting for the Soviets. These observations cast doubt on the CIA's conclusion, frequently echoed elsewhere, that the Soviets might begin testing prototypes of directed-energy weapons in the near future and then start deploying operational weapons.

An analysis of the specific laser technologies available to the Soviets also undermines the credibility of the testing and deployment schedules projected by U.S. officials. Perhaps the Soviets could test a space-based ASAT laser in the 1980s or—more conceivably—in the early 1990s: It could be a gas-dynamic or electric-discharge laser. But such a laser would consume large amounts of power, be expensive to lift into space, and have a relatively short range—in other words, it would not be an attractive candidate for an operational system. A chemical laser might provide more promise, but the United States leads in this field.

Parallel assessments arise in the case of ground-based lasers for ASAT applications. According to U.S. intelligence reports, the Soviets have tested lasers that could be used to interfere with some low-altitude U.S. satellites and are constructing a large facility near Dushanbe in central Asia that may be an ASAT laser. However, the Soviets have not been able to achieve high power levels in short-wavelength lasers that penetrate the atmosphere efficiently. Some satellite components, like sensitive infrared detectors, might be damaged by low-energy fluxes from ground-based lasers, but as operational ASATs, such weapons would be of limited effectiveness.

Thus the CIA paper and other official statements provide only a partial and highly misleading description of Soviet directed-energy weapons activities. Although the Soviet program is substantial, it is very far from developing operationally effective laser weaponry.

Assessing the Soviet Threat

Clearly the administration has not portrayed the Soviet strategic defense effort accurately. Rather, a sudden policy shift has led officials to distort seriously Soviet military capabilities for public and congressional consumption.

Certain upward biases and downward rigidities may be inherent in threat assessment. For example, the military understandably leans toward worst-case assessments, and within the defense establishment pressure inevitably builds to exaggerate the threat when funding for new weapons is at stake. Also, there is a particular tendency in advanced technologies, where progress can be hard to gauge and weapons applications are years away, for intelligence projections to follow the trends of U.S. interest in developing such technologies.

But these factors account for only a small part of the inflation of the Soviet strategic defense threat. Rather, high-ranking administration officials have exaggerated the Soviet SDI as part of a campaign to sell the U.S. program to Congress and the public. The alarmist message from senior government officials has been remarkably consistent. In July 1986 then Assistant Secretary of Defense Richard Perle asserted that the Soviets were "way ahead." In February 1987 then Secretary of Defense Caspar Weinberger claimed that the Soviets "have made . . . greater progress than we have in the field of lasers." And in March 1987 Lieutenant General James Abrahamson, director of the Strategic Defense Initiative Organization, proclaimed, "In the area of ground-based chemical lasers, they are clearly ahead."

Each of these statements contradicts evidence available in the intelligence community. Indeed, in pressing its views so forcefully, the Reagan administration has compromised the independence of the intelligence process. The CIA working paper on Soviet directed-energy weapons clearly was prepared to meet the demands of top officials for ammunition to counter Soviet criticism of SDI. As an intelligence product, the report was poor work: It was one-sided, incomplete, and misleading.

Perhaps more worrisome, in a November 1986 speech, "The Soviets and SDI," CIA Deputy Director Robert Gates relied heavily upon the CIA paper in his warnings about Soviet progress in strategic defense, and he praised the president's "wisdom" in undertaking such a "visionary concept" as SDI. Although his assertions were not as extreme as those of some other officials, Gates's speech was troubling. Political appointees like the secretary of defense and his assistants cannot be expected to avoid slanted conclusions. But when political motives reach the analytic branch of the CIA, the integrity of the intelligence product is compromised. As Graham observed in April 1973, "When intelligence yields to consumer pressure, it cannot remain credible."

Traditionally, Congress has been a key source of alternative information on Soviet military programs. In the case of SDI, however, congressional leaders have tended to seek oversimplified characterizations of the Soviet threat from the administration. For its part, the press has been no less divided than Congress in its approach to SDI. Dependent on government leaks for much of its information, it has tended overall to amplify official claims that the Soviets are ahead in strategic defense technology.

To find that the Reagan administration has exaggerated the threat, however, is not to deny that the United States should be concerned about Soviet strategic defense programs. Indeed, Soviet military doctrine historically has greatly emphasized strategic defense; during the past decade the Soviets have spent $20 billion per year on strategic defense compared with $5 billion by the United States in 1987.[2] In light of such an investment, the United States must watch Soviet missile defense developments very closely. It is entirely legitimate for the intelligence community to assess the Soviet threat under worst-case assumptions—provided that such projections are not presented as the only possible case.

Admittedly there could be a high price to pay for underestimating Moscow's progress. At the same time there is every reason to believe that technical judgments about Soviet missile defense programs can be made with a high degree of confidence. The CIA's March 1984 analysis of the Krasnoyarsk radar, based largely on reconnaissance photographs, proved to be remarkably accurate, as the September 1987 congressional visit confirmed. So long as the United States maintains its modern surveillance technology and its own research base, intelligence agencies should be able to analyze accurately the capabilities of new Soviet weapons systems.

More important, exaggerating Soviet capabilities may prove just as damaging to national security as understating the threat. In the case of strategic defense, the Reagan administration is citing

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[2] *Officials often cite estimates of the dollar value of the total Soviet strategic defense effort—as much as $20 billion per year—as if it were comparable to America's SDI. In fact, the bulk of the Soviet strategic defense expenditure is for air defense, not for missile defense programs.*

Soviet programs as a rationale for fundamentally reordering the entire strategic relationship between the superpowers—a radical and potentially destabilizing policy.

A more balanced assessment of Soviet strategic defense capabilities would still provide a rationale for a significant U.S. effort in researching and developing missile defense technologies but not for a headlong rush to deploy. It is reasonable for the United States to take precautions against the possibility of a Soviet ABM breakout by developing missile penetration aids and by pursuing traditional ground-based missile defense systems. But the United States should stop short of final development of interceptor missiles and construction of battle management radars.

It is more difficult to judge how rapidly the United States should pursue more exotic directed-energy technologies. Clearly, a vigorous research program enables the United States to evaluate the Soviet Union's activity. But the billion-dollar-per-year Soviet investment in directed-energy devices hardly justifies a crash American program to develop such weapons. In March 1984, Cooper, then the Pentagon's research director, repeated to a congressional committee the usual judgment that the Soviets "are spending in the laser area an estimated three to five times as much as we are." But he insisted that Washington should not take its cue from Moscow and match the effort. Rather, he concluded, "With just a little bit more expenditure, say 20 percent, we may be able to offset that [Soviet effort]. . . . [W]e are that much better than they are." With SDI, of course, the United States has tripled spending on directed-energy weapons research since 1981—from $272 million to almost $850 million in fiscal year 1987.

Alarmist statements by senior government officials concerning Soviet missile defense programs, therefore, serve no good purpose. Rather, they only distort public debate over the proper extent and goals of U.S. military research and development programs. As former CIA Director William Colby once put it, "In a political debate where knowledge can be power, intelligence judgments must be supplied impartially to all factions, to help the best solution emerge, not just the favored one." In the case of the Soviet SDI, unfortunately, his prescription has been honored only in the breach.

Dr. CAHN. For the most part these are based on a discredited premise that the Soviets would rely on a network of early warning radars as the key elements of a missile defense system. But such radars are vulnerable to direct attack and susceptible to blackout from nuclear explosions in the upper atmosphere, and therefore would constitute an extremely fragile foundation for a nationwide ABM deployment.

These new alarms, therefore, are not very credible, and although there is reason to watch Soviet ABM developments closely, there is no real cause for concern. It would take many years for the Soviets to deploy a nationwide ABM system using traditional ABM technologies, and the United States would have plenty of warning that the Soviets were moving in such a dangerous direction.

Consequently, even though the Soviets have maintained a treaty-compliant ABM system around Moscow, and have been upgrading it with a new battle management radar and new interceptors in recent years, we see no need for the United States to match the Soviet deployment. Since the United States would have time to react should the Soviets begin building a nationwide ABM system, it makes more sense for us to spend our limited funds developing more advanced technology systems.

It is sufficient as a hedge against a Soviet decision to pursue nationwide defenses to have technology ready to enter engineering development. In any case, interceptor missiles like ERIS and HEDI would not be the key long lead items of a nationwide missile defense.

So far no one has described in concrete terms the alleged advantages of operational experience with a limited ABM system. Presumably, a viable ALPS would not require a great deal of daily maintenance. An extensive testing program at the Kwajalein test site ought to be sufficient to make judgments about the operational effectiveness of currently available technologies.

A full nationwide defense, should it prove necessary to build one, would take years to construct, leaving plenty of time to train the operating personnel. Thus, unless it is clear that a limited deployment can accomplish some useful strategic objective, we do not see it as necessary or advisable to go into full-scale engineering development of its components.

The strength of the case for a limited ABM deployment, therefore, rests on how we assess the need for limited protection of the country against a very small missile threat, and the chances that a treaty-compliant ABM deployment can offer such protection. It is certainly true that the public as a whole often appears concerned about an accidental missile strike against America. But the real extent of that threat is greatly exaggerated.

The United States and the Soviet Union have deployed long-range missiles for about 30 years now, and together we today deploy almost 4,000 long-range nuclear missiles. But in all that time and with all those weapons there has never been an accidental or unauthorized launch.

Responsible political leaders certainly cannot afford to dismiss the public's concern about a nuclear balance of terror that sometimes seems out of control. But nor should they dismiss the public's concern about the high cost of strategic defense and widespread popular enthusiasm for arms control.

To the extent that a real danger of an accidental missile launch exists, it probably would arise from a mistaken reading by one side of the other's intentions during a major confrontation. That is, an unintended war could result. The appropriate response is not to deploy an ABM system, but to improve communications in the event of a crisis.

Senators Nunn and Warner, among others, deserve great credit for initiating the opening of risk reduction centers that could play a genuinely important role in keeping a crisis from getting out of hand. I strongly endorse these practical measures, but I also cling to the perhaps rather miserly view that the Nation should not have to spend $4 billion to $10 billion in order to waylay unfounded appeals to popular misconceptions.

In any event, to the extent that the danger is real, the range of threats against which an ALPS might offer some effective protection would be very limited, even assuming the best technical performance conceivable. An ABM Treaty-compliant deployment of 100 interceptors at a single site near Grand Forks, ND, would not protect the coastal areas of the United States against the accidental launch of a missile from a submarine patrolling fairly close to U.S. shores, just north and east of the Caribbean, for example.

As McDonnell-Douglas acknowledged, no thin defense could offer adequate protection against anything except the smallest conceivable accidental missile launch. An unauthorized missile launch would most likely be too large for a small defense to cope with.

A rogue Soviet submarine commander, for example, assuming a crazed group could take control of a submarine and would be able to launch its missiles, could fire between 12 single warhead and 20 multiple warhead missiles. An unauthorized Soviet ICBM launch would most likely involve what they call a regiment, that is, controlling between 6 and 10 missiles with up to 10 warheads each. Even a strictly accidental ICBM launch might be as large.

Moreover, it is quite likely that an accidental launch protection system would quickly be rendered obsolete by Soviet deployment of chaff and decoys. The Soviet decision to upgrade its Moscow ABM system prompted the United States to pursue a vigorous penetration aids program. Even a very limited ABM deployment might lead the Soviets to do the same. A deployment that went beyond what the ABM Treaty now permits, even if the Soviets agreed to modify the treaty to allow such a system, would almost certainly prompt the Soviets to employ penaids.

Lockheed's argument that the LWIR pop-up sensors can discriminate between decoys and warheads and allow ERIS to remain effective against decoys is simply not credible. The SDIO has long acknowledged that decoy discrimination is one of the most difficult technical tasks to be resolved, and it does not pretend that passive infrared sensors can do the job.

Ted Postol, a physicist at Stanford University and a former scientific adviser to the Chief of Naval Operations, and a number of other experts have suggested designs for simple, inexpensive decoys that would be extremely effective in deceiving the LWIR sensors.

HEDI, of course, would be more useful against decoys since it can rely on atmospheric filtering to discriminate the real warheads from the decoys. But an endoatmospheric interceptor system would have to be deployed at many sites to protect the whole United States. Such a deployment would destroy the ABM Treaty.

In fact, the greatest concern I have with the idea of an ALPS is that it may constitute a fatal step down the slippery slope toward abrogation of the ABM Treaty. This is especially true because it would quickly become clear to the public that a treaty-compliant ALPS deployment of 100 interceptors at a single site would not protect the most populous parts of the country. Even accepting Lockheed's premise that Soviet missile submarines would be based 900 miles or more out in the ocean, it is not credible to believe that an ERIS deployment at Grand Forks can protect coastal areas.

Lockheed assumes that interceptor missiles can be fired at their targets within 100 seconds after a submarine-based missile is launched. Even with perfect detection, a 100-second response to a totally unexpected attack would be remarkable. But as Ted Postol has shown, a missile from a submarine 900 miles out in the ocean would not come over the radar horizon of coastal early warning radars until well after 100 seconds have passed. As the President's science advisor, William Graham, acknowledged to a forum on SDI just last week, an ERIS system at Grand Forks would not protect the country "west of the Sierras and east of the Appalachians" from submarine launched missile attack.

This is a shortcoming that will probably be noticed by the 52 percent of the U.S. population that lives in States on either coast. Indeed, there is good reason to believe that Soviet submarines off the U.S. coast aim their missiles at key military sites near major metropolitan areas. Voters in Detroit and Lincoln might feel more secure with ALPS therefore, but constituents in New York, Newport News, San Diego, or even Atlanta might somehow feel that more had been promised than was delivered.

McDonnell-Douglas, I am sure, would be happy to offer a solution. But deployment of shorter-range interceptors at several sites, along with associated radars, would require more than a minor adjustment to the ABM Treaty. Most importantly, if the United States were to demand an adjustment of the treaty to allow deployment at a sufficiently large number of sites to ensure nationwide thin missile defense, the Soviets would surely demand the same.

Since the Soviet Union is larger than the United States, and U.S. submarine-launched missiles pose a threat from almost every direction, such a nationwide Red ALPS would require many more defensive sites than the United States would require.

We would feel extremely uneasy about construction of 6 or 12 or 15 antimissile bases in the U.S.S.R., since such a Soviet defensive network would provide a very threatening foundation for a Soviet breakout from the ABM Treaty. The very marginal contribution that an accidental launch protection system might make to U.S. security would be vastly outweighted by the threat that such a comparable Soviet deployment would pose to the ABM Treaty.

There remains one more popular argument for a limited ABM system, that it might be useful against a very limited missile attack from a smaller nuclear power. To date, only the Soviets, the

British and the French possess any significant number of missiles that could reach U.S. territory. China may have just a few.

If other nations develop nuclear weapons, however, it is unlikely that they would rely on long-range missile delivery systems. And if an outlaw nation armed with nuclear weapons is determined to attack the United States, as you mentioned in your question this morning, Mr. Chairman, plenty of other means are available to deliver a bomb into our country. ALPS will not protect against nuclear terror.

In the end, therefore, despite recent advances in ABM technology, protection promised by a limited missile defense system is of doubtful value. ALPS is technically more difficult to accomplish than some have suggested, and a system that would protect the entire country would require very extensive deployment that would endanger the ABM Treaty. And the ABM Treaty remains the very foundation of any possible future progress in arms control.

If, therefore, we are greatly concerned about the danger of an accidental or unauthorized missile attack against the United States, we should pursue more achievable, cheaper, and less destabilizing solutions than deploying a limited ABM. One solution is to seek arms control agreements that will reduce the number of Soviet missiles.

We could also engage the Soviets in detailed discussions of missile command and control systems. We might offer to share our permissive action link technology with the Soviets, and a good start would be to place those PALS, those permissive action links, on our own submarine-based weapons.

Finally, if further steps are thought necessary, we should consider a joint agreement to equip missiles with in-flight-destruct mechanisms like those on space launch vehicles and test missiles. But we should not pretend that a limited missile defense makes any more sense today than it did 20 years ago.

Thank you.

[The prepared statement and additional information of Dr. Cahn follows:]

Statement of Dr. Anne H. Cahn
before the
Senate Armed Services Committee

Mr. Chairman and members of the Committee, thank you for inviting me to testify today on the issue of an anti-ballistic missile system with the limited goal of protecting the United States against an accidental or unauthorized launch of nuclear-armed missiles aimed at our territory. I am the director of the Committee for National Security (CNS), a non-partisan educational organization composed of former senior government officials, scientists, and civic leaders with experience in national security affairs. As such, I appreciate the opportunity to discuss the our views with you.

Over the next few months, the Armed Services Committee -- and, indeed, the Congress as a whole -- will face a number of very important questions concerning the proper direction of President Reagan's Strategic Defense Initiative. One of those questions concerns the extent to which the SDI research and development program should be directed toward engineering development of a new generation of ground-based missile interceptors with a view toward deploying what Senator Nunn has termed an "Accidental Launch Protection System" (ALPS) in the early 1990s.

A few weeks ago, I went on record with a critique of ALPS that was printed in Defense News, and I have attached a copy of that article to this statement. Having written my doctoral dissertation, titled Eggheads and Warheads, on the role of scientists in the ABM debate of the late 1960s, the proposal to move toward deployment of an anti-missile system with such a very limited strategic role brought to my mind the Johnson administration's rather less than whole-hearted argument for ABM deployment when it undertook development of the limited Sentinel system. On September 18, 1967, Secretary of Defense Robert McNamara delivered a now-famous speech which constituted a forceful critique of the then-current infatuation with missile defense. Mr. McNamara pointed out that the most appropriate response to an adversary's deployment of an anti-missile system was not necessarily to deploy a similar system, but rather to upgrade offensive forces in order to overwhelm the defense; that deployment of a nationwide missile defense therefore would almost certainly make negotiated constraints on offensive nuclear weapons impossible; that foreseeable technology did not hold out a realistic prospect of an effective defense of the population, especially in the face of an unconstrained strategic offensive threat; and that arms control measures including strict constraints on strategic defense therefore offered the best chance of establishing a stable nuclear balance of forces.

At the end of his speech, McNamara nonetheless added an announcement that the Johnson administration would pursue a limited ABM system designed not against a large Soviet attack, but against the much smaller prospective missile threat from China. It seems clear in retrospect that the decision to pursue such a limited system despite McNamara's skepticism was motivated primarily by political considerations. The case for designing a system against the Chinese stretched credibility. For one thing, no real Chinese long-range missile threat then existed -- and even now China has only a handful of intercontinental-range weapons. More than that, it was difficult to see how a system using the technology of the time would be very effective against even a very few ICBMs, however primitive Chinese technology might appear. Nonetheless, given Soviet development of an ABM system, the political price of failing to respond in a like manner was apparently too high for the Johnson adminstration to bear.

I am afraid that I read Senator Nunn's January 19, 1988 speech before the Arms Control Association, in which the Senator proposed consideration of an Accidental Launch Protection System, in much the same light. In response, I felt compelled to express the doubts that I and many members Committee for National Security have about the value of a limited missile defense system of any kind. But before I go into these problems, I want to emphasize that the Committee's possible differences with Senator Nunn on the question of ALPS are, compared to our agreement on every other issue he raised in his speech, exceedingly minor. Indeed, even on the question of ALPS, I should note that the Senator's proposal was worded very carefully, citing defense against accidental or unauthorized missile launches as only a possibility that should be further explored.

In fact, I would go so far as to say that CNS agreed with ninety-nine and forty-four-one-hundredths percent of what Senator Nunn said concerning the direction of the Strategic Defense Initiative and the relationship between SDI and arms control. We hope, therefore, that whatever this Committee and the Congress as a whole decide to do about ALPS, it will be possible to make significant progress this year toward a consensus on a reasonable SDI research program along the lines that Senator Nunn laid out.

To review that consensus out a little bit: The SDI research program should be carried out in a fashion that is clearly consistent with the traditional interpretation of the 1972 ABM Treaty. It will be years before the United States is in a position to judge the possible effectiveness of exotic technologies such as lasers for ballistic missile defense. As a result, there is no reasonable scientific case to be made for tests of such devices in a manner that might breach the ABM Treaty, and the United States has everything to gain from specific discussions with the Soviets to determine how the ABM Treaty's provisions apply to testing in space of such advanced technologies. Further, a "Phase I" deployment of a strategic defense system based on space-based interceptors does not offer a reasonable prospect of a cost effective and survivable strategic defense, and any such deployment would quickly be rendered obsolete. Research should therefore be redirected away from such a premature deployment program.

Instead, a "Sensible Defense Initiative" would have a dual focus. It would invest reasonable amounts in exploring advanced technologies, such as lasers and sophisticated space-based sensors, in order to assess their prospects for the future. And it would finance extensive development of ground-based ABM systems, including ground-based interceptor missiles, as permitted by the ABM Treaty.

Such a program of ABM Treaty-compliant research into advanced technologies of potential interest in the long-term, and treaty-compliant development of ground-based ABM technologies that could be deployed in the nearer term, should it be necessary, would offer important advantages: It would allow the United States to evaluate the potential dangers posed by Soviet research efforts, plan countermeasures if they should prove necessary, exploit advanced technologies for non-strategic applications, react if the arms control process should break down, and spur on arms control negotiations.

Accidental Launch Protection

With all of that being said, I feel more comfortable in discussing the fifty-six-one-hundredths of one percent of disagreement that I and CNS may have with Senator Nunn. Actually, even when it comes to development of technologies that would be potential candidates for an ALPS, I am not sure there is a great deal of difference between us. SDI should carry on planned technology demonstration and validation tests of Lockheed's Exoatmospheric Reentry-Vehicle Interceptor System

(ERIS) and of McDonnell-Douglas's High Endoatmospheric Defense Interceptor (HEDI). It should also continue with advanced technology development of smaller, less expensive versions of these interceptor missiles for demonstration in the 1990s.

The best case that can be made for full-scale engineering development and limited deployment of ERIS (or of ERIS plus HEDI), however, seems to us unpersuasive. As we read it, the case for such a limited deployment would run something like this: A treaty-compliant deployment of 100 interceptors at a single site would essentially match the Soviet deployment of an ABM system around Moscow; it would give the United States comparable operational experience with a deployed ABM system and it would establish a hot production line for ABM components; it would therefore provide a hedge against a Soviet effort to break out of the ABM Treaty with deployment of a nationwide ABM system using traditional ABM technologies; and it might also offer some protection of at least part of the country against some accidental or unauthorized launches of missiles aimed at U.S. territory.

We agree that a principal reason for carrying on a significant ERIS and HEDI technology development program is to provide a hedge against a Soviet breakout from the ABM Treaty. Such a Soviet breakout effort, however, does not appear to be an imminent threat. There has recently been a spate of stories in the anti-arms control press raising alarms about Soviet radar programs that, it is alleged, constitute the key long-lead elements of a nationwide Soviet ABM deployment. The CNS staff recently investigated these and other alarmist claims about Soviet missile defense programs for an article published in the current issue of Foreign Policy magazine. (I will be happy to provide a copy to the Committee and to any members who might be interested.) In addition, a number of other analysts, including Sayre Stevens and Michael Krepon, have written extensively about

Soviet ABM technologies. There is nothing new in recent charges that the Soviets "are" or "may be" preparing to deploy a nationwide missile defense, and all such arguments have proved to be grossly overstated. For the most part, they are based on the discredited premise that the Soviets would rely on a network of early warning radars as the key elements of a missile defense system. But such radars are vulnerable to direct attack and susceptible to blackout from nuclear explosions in the upper atmosphere, and therefore would constitute an extremely fragile foundation for a nationwide ABM deployment. Suffice to say, these new alarms are not very credible. And although there is reason to watch Soviet ABM developments closely, there is no real cause for concern. It would take many years for the Soviets to deploy a nationwide ABM system using traditional ABM technologies, and the United States would have plenty of warning that the Soviets were moving in such a dangerous direction.

As a result, even though the Soviets have maintained a treaty-compliant ABM system around Moscow, and have been upgrading it with a new battle management radar and new interceptors in recent years, we see no need for the United States to match the Soviet deployment. Since the United States would have time to react should the Soviets begin building a nationwide ABM system, it makes more sense for us to spend limited funds developing more advanced technology systems. It is sufficient as a hedge against a Soviet decision to pursue nationwide defenses to have technology ready to enter engineering development. And in any case, interceptor missiles like ERIS and HEDI would not be the key long-lead items of a nationwide missile defense.

Furthermore, so far no one has described in concrete terms the alleged advantages of operational experience with a limited ABM system. Presumably, a viable Accidental Launch Protection System would not require a great deal of daily maintenance. An extensive testing program at the Kwajalein test range ought to be sufficient to make judgments about the operational effectiveness of currently available technologies. A full nationwide defense, should it prove necessary to build one, would take years to construct, leaving plenty of time to train operating personnel. Thus, unless it is clear that a limited deployment can accomplish some useful strategic objective, we do not see it as necessary or advisable to go into full-scale engineering development of its components.

The strength of the case for a limited ABM deployment, therefore, depends on how we assess the need for limited protection of the country against a very small missile threat, and the chances that a treaty-compliant ABM deployment can offer such protection. It is certainly true that the public as a whole often appears concerned about an accidental missile strike against America. But the real extent of the threat is greatly exaggerated. The United States and the Soviet Union have deployed long-range missiles for about 30 years now, and today deploy almost 4,000 long-range nuclear missiles between them. But in all that time and with all those weapons, there has never been an accidental or unauthorized missile launch.

Some advocates of full scale strategic defense deployment sometimes rather disingenuously preach that the United States is defenseless even against a single missile flying toward the country. My reading of popular opinion, however, is that the public is most concerned about nuclear accidents of various kinds when people feel that the nuclear arms race is out of control and that U.S.-Soviet relations are going badly. When relations improve, and arms control agreements are achieved, concern declines.

Responsible political leaders certainly cannot afford to dismiss the public's concern about a nuclear balance of terror that sometimes seems out of control. But not should the dismiss the public's concern about the high cost of strategic defense, and widespread popular enthusiasm for arms control. To the extent that a real danger of an "accidental" missile launch exists, it probably would arise from a mistaken reading by one side of the other side's intentions during a major confrontation. An "unintended" war could result. The appropriate response is not to deploy an ABM system, but to improve communications in the event of a crisis. Senators Nunn and Warner, among others, deserve great credit for initiating the opening of risk reduction centers that could play a genuinely important role in keeping a crisis from getting out of hand. I strongly endorse these practical measures, but I also cling to the perhaps rather miserly view that the nation should not have to spend four to ten billion dollars in order to waylay General Daniel Graham's unfounded appeals to popular misconceptions.

In any event, to the extent that the danger is real, the range of threats against which an Accidental Launch Protection System might offer some effective protection would be very limited, even assuming the best technical performance conceivable. Such a defense would not offer significant protection against the kind of large-scale attack that the Soviets might launch if they misread the likely outcome of a crisis confrontation. An ABM Treaty-compliant deployment of 100 interceptors at a single site near Grand Forks, North Dakota, would not protect coastal areas of the United States against the accidental launch of a missile from a submarine patrolling fairly close to U.S. shores -- just north and east of the Caribbean, for example.

Indeed, no thin defense would offer adequate protection against anything except the smallest conceivable accidental missile launch -- an unauthorized missile launch would most likely be too large for a small defense to cope with. A "rogue" Soviet submarine commander, for example -- assuming a crazed group could take control of a submarine and would be able to launch its missiles -- could fire between 12 single-warhead and 20 multiple-warhead missiles. An unauthorized Soviet ICBM launch would most likely involve what they call a "regiment," controlling between six and ten missiles with up to ten warheads each. Even a strictly accidental ICBM launch might be as large.

Moreover, it is quite likely that an Accidental Launch Protection System would quickly be rendered obsolete by Soviet deployment of chaff and decoys. The Soviet decision to upgrade its Moscow ABM system prompted the United States to pursue a penetration aids program, which has now been only temporarily deferred. Even a very limited ABM deployment might lead the Soviets in the same direction. A deployment that went beyond what the ABM Treaty now permits, even if the Soviets agreed to modify the Treaty to allow such a system, would almost certainly prompt the Soviets to deploy penaids.

Lockheed's argument that long-wavelength infrared (LWIR) pop-up sensors can discriminate between decoys and warheads and allow ERIS to remain effective against decoys is simply not credible. The Strategic Defense Initiative Organization has long acknowledged that decoy discrimination is one of the most difficult technical tasks to be resolved, and it does not pretend that passive infrared sensors can do the job. Ted Postol, a physicist at Stanford University, and a number of other experts have suggested designs for simple, inexpensive decoys that would be extremely effective in deceiving LWIR sensors. HEDI, of course, would be more useful against decoys, since it can rely on atmospheric filtering to discriminate the real warheads. But an endoatmospheric interceptor system would have to be deployed at many sites to protect the whole United States. Such a deployment would destroy the ABM Treaty.

In fact, the greatest concern I have with the idea of an Accidental Launch Protection System is that it may constitute a fatal step down the slippery slope toward abrogation of the ABM Treaty. This is especially true because it would quickly become clear to the public that a treaty-compliant ALPS deployment of 100 interceptors at a single site would not protect the most populous parts of the country. Even accepting Lockheed's premise that Soviet missile submarines would be based 900 miles or more out in the ocean, it is not credible to believe that an ERIS deployment at Grand Forks can protect coastal areas. Lockheed assumes that interceptor missiles can be fired at their targets within 100 seconds after a submarine-based missile is launched. Even with perfect detection, a 100 second response to an unexpected attack would be remarkable. But as Ted Postol has shown, a missile from a submarine 900 miles out in the ocean will not come over the radar horizon of coastal early warning radars until well after 100 seconds have passed. As the President's science advisor, William Graham, acknowledged to a forum on SDI just last week, an ERIS system at Grand Forks would not protect the country "west of the Sieras and east of the Appalachians" from submarine-launched missile attack.

This is a shortcoming that would probably be noticed by the 52 percent of the U.S. population that lives in states on either coast. Indeed, there is good reason to believe that Soviet submarines off the U.S. coast aim their missiles at key military sites near major metropolitan areas. Voters in Detroit and Lincoln might feel more secure with ALPS, therefore, but constituents in New York, Newport News, San Diego, or even Atlanta might somehow feel that more had been promised than was delivered.

McDonnell-Douglas, I am sure, would be happy to offer a solution. But deployment of shorter-range interceptors at several sites, along with associated radars, would require more than a minor adjustment to the ABM Treaty. Most importantly, if the United States were to demand an adjustment of the Treaty to allow deployment at a sufficiently large number of sites to ensure a thin nationwide missile defense, the Soviets would surely demand the same. Since the Soviet Union is larger than the United States, and U.S. submarine-launched missiles pose a threat from almost every direction, such a nationwide Red ALPS would require many more defensive sites than the United States would require. We would feel extremely uneasy about construction of six or twelve or fifteen anti-missile bases in the U.S.S.R., since such a Soviet defensive network would provide a very threatening foundation for a Soviet breakout from the ABM Treaty. The very marginal contribution that an Accidental Launch Protection System might make to U.S. security would be vastly outweighed by the threat that such a Soviet deployment would pose to the Anti-Ballistic Missile Treaty.

There remains one more popular argument for a limited ABM system -- that it might be useful against a very limited missile attack from a smaller nuclear power. To date, only the Soviets, the British, and the French possess any significant number of missiles that could reach U.S. territory -- China may have just a few. If other nations develop nuclear weapons, however, it is unlikely that they would rely on long-range missile delivery systems. And if an outlaw nation armed with nuclear weapons is determined to attack the United States, plenty of other means are available to deliver a bomb into the country. ALPS won't protect against nuclear terror.

In the end, therefore, despite recent advances in ABM technology, the protection promised by a limited missile defense system is of doubtful value. Accidental Launch Protection is technically more difficult to accomplish than some have suggested, and a system that would protect the entire country would require a very extensive deployment that would endanger the ABM Treaty -- and the ABM Treaty remains the very foundation of any possible future progress in arms control.

If, therefore, we are greatly concerned about the danger of an accidental or unauthorized missile attack against the United States, we should pursue more achievable, cheaper, and less destabilizing solutions than deployment of a limited ABM system. One solution is to seek arms control agreements that will reduce the number of Soviet missiles. We could also engage the Soviets in detailed discussions of missile command and control systems. We might offer to share our permissive action link technology with the Soviets -- and a good start would be to place permissive action links on our own submarine-based weapons. Finally, if further steps are thought necessary, we should consider a joint agreement to equip missiles with in-flight destruct mechanisms like those on space-launch vehicles and test missiles. But we should not pretend that a limited missile defense makes any more sense today than it did twenty years ago.

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Reagan's SDI: an Echo From the Past

Why Should Lawmakers Substitute One Bad Idea With Another?

By ANNE CAHN

History repeats itself, so it should come as no surprise to those of us who remember the Antiballistic Missile (ABM) debate of 20 years ago that much of the current discussion of President Reagan's Strategic Defense Initiative sounds like a slightly garbled echo of the past.

Then, as now, the advocates of antimissile systems started out heralding the moral superiority of defense over retaliation. Then, as now, the real debate concerned the value of the less-than-wholly effective defenses that were — and are — technically achievable. And then, as now, thoughtful officials, properly skeptical about the technical feasibility and arms control implications of a full-scale missile defense program, nonetheless found it somehow politically advisable to endorse a limited ABM deployment of dubious military value in order to preempt support for a more extensive, expensive and destabilizing strategic defense effort.

The latest reverberation of the old ABM debate was heard recently. Sen. Sam Nunn, the influential chairman of the Senate Armed Services Committee, suggested deployment of a very limited antimissile system designed to defend against an accidental or unauthorized launch of ballistic missiles aimed at the United States — an Accidental Launch Protection System, or ALPS, he called it.

Nunn's speech was, in a curious way, almost a replay of a famous speech by then-Secretary of Defense Robert McNamara on Sept. 18, 1967. In that talk, McNamara announced the Johnson administration's intention to pursue deployment of the Sentinel ABM system, a thin nationwide defense designed not against a large Soviet attack, but against the much smaller, more primitive prospective missile threat from China. In announcing the Sentinel program, however, McNamara devoted the bulk of his presentation to a forceful critique of the case for ABM deployment. Indeed, his speech may rank as the least enthusiastic endorsement of a new initiative in the history of public policy advocacy.

Though Nunn hedged his language more than McNamara, his speech too was primarily a brief against the current infatuation with missile defense. He rejected the argument that technology available in the foreseeable future will provide a highly effective shield against virtually all nuclear-armed missiles. He presented almost as strong a pitch for arms control as McNamara. He specifically endorsed negotiations with the Soviet Union to discuss how the 1972 ABM Treaty — understood as it traditionally has been before the Reagan administration's 1985 reinterpretation — applies to tests of advanced technologies in space. And he objected to development of space-based interceptor missiles (SBI), the Reagan administration's choice for early deployment of a space-based defense.

Taken as a whole, Nunn's speech reflected an attitude toward SDI that critics of the program could comfortably embrace. Indeed, even those most skeptical about SDI endorse, as Nunn did, a research program that would do two things: Invest reasonable amounts in exploring advanced technologies, such as lasers, in order to assess their prospects for the future; and focus development efforts on ground-based interceptor missiles and related traditional ABM technologies as a hedge against a Soviet "breakout" from the ABM Treaty.

A research program with such a dual focus will allow the United States to evaluate the potential dangers posed by Soviet research efforts, plan countermeasures if they should prove necessary, exploit advanced technologies for non-strategic applications, react if the arms control process should break down, and spur on the arms control process. Such a research program would not conflict with a strict, traditional interpretation of the ABM Treaty.

What, then, are we to make of Nunn's argument for possible deployment, as opposed to mere exploratory development, of a ground-based antimissile system? Evidently, Nunn has in mind a development effort focused away from SBI and toward a more practical technology, such as Lockheed's Exoatmospheric Re-entry Vehicle Interpretation System (ERIS). ERIS is a long-range, land-based, non-nuclear armed missile that will be designed to intercept incom-

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ing warheads in the late midcourse stage of flight, just before they reenter the atmosphere.

Exploratory development of ERIS technology certainly fits with a reasonable SDI research effort. But is full-scale engineering development and deployment of ERIS advisable or necessary in order to protect against accidental or unauthorized launches?

Four arguments suggest it is not: The project is technically more difficult and would require a more extensive deployment than many recent discussions have suggested; such a deployment would create very difficult arms control problems; the threat is easily overstated; and to the extent that there is a problem, other, less costly and troublesome solutions are available.

Technically, the ERIS system, deployed at a single site, would theoretically protect the bulk of the continental United States against missiles coming over the North Pole. But at least three or four, and possibly more sites would be necessary to protect against missiles that might come from other directions.

Is there any reason why we should worry more about an accidental launch of a Soviet land-based ICBM than about a launch of a submarine-based missile in the Atlantic or Pacific? And why worry only, or primarily, about the Soviets? China has long-range missiles now, and potentially hostile countries may build them in the near future. For that matter, the French have insisted that their nuclear weapons are aimed, as they delicately put it, at all azimuths.

Second, an Accidental Launch Protection System would erode the Antiballistic Missile Treaty, which prohibits "nationwide defense" and permits deployment of a defense system at just one site. Nunn acknowledges that ALPS might require a slight amendment to the ABM Treaty, but deployment of an antimissile system with a defensive "footprint" of several thousand square miles at three or four or more sites goes substantially beyond the level of defense contemplated when the treaty was signed.

More importantly, if the United States is now to be allowed a thin nationwide defense, the Soviets surely will demand the same. Because the territory of the Soviet Union is much larger, and Soviet ABM technology may be less effective at very long range, and American submarines pose a threat from every direction, a "Red ALPS" system to protect the Soviet Union would require many more deployment sites. The United States would feel extremely uneasy about construction of six or 12 or 15 antimissile bases in the Soviet Union, because such a Soviet network would provide a threatening foundation for their rapidly breaking out of ABM Treaty constraints.

Third, how great is the threat? Many citizens understandably fear that nuclear technology is out of control, so a call for ALPS is likely to strike a responsive popular chord. The renegade Russian submarine captain, after all, was the stuff of a good Tom Clancy novel (though Clancy's Russian hero was trying to defect, not to attack), and the computer glitch that could start World War III was the staple of many a rousing Helen Caldicott speech. But leaving fiction aside, plenty of other threats are much more plausible and ought to be of more concern. The United States cannot afford to respond to every unlikely danger with a multibillion dollar program.

Finally, if we are sufficiently worried about an accidental or unauthorized launch of a Soviet missile, there are easier, quicker and cheaper ways to reduce the threat than to embark on ALPS. Drastically reducing the number of Soviet missiles through arms control negotiations obviously is one remedy. A second could be bilateral consultations about improving command and control of both countries' missile systems. The United States might consider sharing our permissive action link technology with the Soviets, while placing these links on the U.S. Navy's nuclear weapons, which do not have them.

Twenty years ago, McNamara's rationale for an anti-Chinese ABM system stretched the limits of credibility. Sentinel, it was admitted, would not be effective against a "sophisticated" Soviet attack — but how "primitive" could an ICBM attack be, even coming from the backward Chinese? The humorist Calvin Trillin best captured the flaw in the concept. The idea of a primitive intercontinental-range missile, he said, conjured up "visions of thousands of Chinese peasants laboriously carting the mud of the Yangtze to crude molds, creating out of the baked earth something that roughly resembles an intercontinental ballistic missile, straining together to pull it back on some enormous catapult and launching it 7,000 miles over the Pole in an attempt to obliterate Chicago."

Like McNamara, Nunn has eloquently explained that an all-out effort to develop a full-scale missile defense remains a bad idea. Why, then, feel equally compelled to come up with another bad idea as a substitute?

SDI PROGRAM

Senator **Exon**. Dr. Cahn, thank you very much. I have listened with keen interest to your positions that have been well stated. We are pleased you have come to offer this testimony this morning because we always try to hear all sides of an issue as we make these very important decisions here. I suspect that it would be safe to say, and I do not want to put this in the form of an understatement, but you are not enthused about the whole SDI program. Is that right?

Dr. **Cahn**. That is right. I am not enthused about deployment of an SDI program. The committee has always been in favor of a very robust research program on strategic defense.

Senator **Exon**. But not deployment?

Dr. **Cahn**. But not deployment.

Senator **Exon**. Given that, then, and what you heard from our industry witnesses this morning, it would indicate that they feel that especially with some expedited programs that we would be in a position to deploy this limited defense system at a very early date.

Would it be fair to argue that because of your position you would consider that early deployment of this system would be giving considerable encouragement to SDI in its total concept as envisioned by the President, and that therefore if we proceeded with this we would be likely launching into the first phase of deployment that would eventually get up into the hundreds of billions, if not trillions, of dollars, as outlined by the President and the administration on numerous occasions?

I am wondering if you are not concerned that this is one of those nose of the camel under the tent propositions.

Dr. **Cahn**. Well, there certainly is some of that element in my testimony; there is no question about that. I think that our greatest objection to it is that it seems, given the tight fiscal constraints that our country is facing at this time, it seems unwarranted to embark on spending billions of dollars to counter one possible and very improbable threat to our country, when we are, as Senator Nunn said in his speech, a nation of networks and we have a great many vulnerabilities to a great number of threats.

And I think it would be more prudent to try and defend ourselves from more likely threats than to spend a great sum of money and invest a lot of technical, scientific manpower and expertise in defending one of the least likely threats to our national security.

Senator **Exon**. Dr. Cahn, you said in your statement I think, in effect—I do not mean to paraphrase, but in effect I think you said or indicated that because we have not had an accidental or unauthorized launch of some type for over 30 years, it should not be taken seriously as a potential problem for the future.

I am not sure that that rationale is entirely appropriate. After all, we have not had a nuclear war in over 40 years, but surely you would not take that fact alone, would you, as sufficient reason for dismissing the importance of the problem of preventing a nuclear war?

Dr. CAHN. Well, I am certainly not wanting to imply that. What I said in the conclusion of my testimony was that as we worry about an accidental launch there are many other things that we could do to prevent such an accidental launch other than deploying the systems that we were discussing.

One of those would be to share our permissive action link technology with the Soviet Union. Another would be to discuss with them having destruct mechanisms on both of our ICBMs and SLBMs, so that we certainly are not uncognizant of problems. But it does not seem to us that the best solution to those problems would be to deploy this system.

Senator EXON. Dr. Cahn, I want to ask you the same question that I asked of the industry witnesses here, because I suspect you have a lot of expertise in this area.

TREATY COMPLIANCE

For the proposed system you have heard described here today, where in your judgment does treaty compliance end, and what sort of specific amendments would be required to that treaty, if any, before we could proceed with what is proposed here on the screen this morning?

Dr. CAHN. Well, if the system that you are referring to would be the full-scale deployment of several HEDI sites, as well as the ERIS sites, clearly that would be prohibited by the ABM Treaty. The ABM Treaty is very clear that we can have 100 interceptors at one location. So if we went to the full-scale, dual deployment that would require amending the treaty.

Senator EXON. Yes, I indicated that. I guess then, to clarify and specify the question a little bit more, if we stayed within 100 interceptors at Grand Forks, I assume that you would agree that would not be a violation of the treaty?

Dr. CAHN. I would agree.

Senator EXON. But if we went beyond that I think there would be general agreement that we would.

Would you agree with the conclusions that I drew from that with the question that I asked the industry witnesses with regard to the fact that I suspect the Soviets must be concerned about an accidental launch of some kind?

And it would seem to me that if something like this were proposed that we might not have a great deal of difficulty in getting them to amend the treaty so long as sufficient limitations were placed upon it. Would you agree with that?

Dr. CAHN. I have no evidence that the Soviets would be interested in amending the ABM Treaty to bring that about. I am not aware of any intentions or interest in that that they have expressed.

Senator EXON. I guess that probably reflects your basic view though that I think you have articulated very well, and that is that you do not believe there is much of a likelihood of an accidental launch of any kind.

I was coming at it from the proposition that I have been concerned about that for some time. I do not know whether it is a logical fear or not, but I have been concerned about it and I suspect that since the Soviets, although we do not pay much attention to it, the Soviets by their very military nature as far back as we can remember, even before the Communist regime, and including the Communist regimes, have been essentially cautious risk takers.

So I thought that their planners might be worried about an accidental launch that they would not know how to handle, as this individual Senator was. Do you suspect that they do not share that concern?

Dr. CAHN. No. The other question that you asked me, the previous question was were the Soviets interested in amending the treaty to allow for the kinds of systems we are talking about, and my reply was I was not aware that they had expressed any interest. But clearly they would be, for their own national security interest, very much as interested in having discussions with us about how to prevent an accidental launch of our forces as we are in preventing one from theirs.

And therefore it seems to me that they would be very interested in discussing with us the sharing of our PAL technology or the discussions about the destruct mechanisms, or further improvements in the risk reduction centers which I think are a very good first step. I mean, there are many other ways in which we and the Soviets can act in concert to prevent the risk to each of us.

I do not mean to minimize the risk of an accidental nuclear launch; there is such a risk. I think that the risk of such an accidental nuclear launch being of one missile only, without any penaids or chaff, is much smaller than the total risk of an accidental launch. And the ALPS system is only effective against one very small kind of an accidental launch out of possible different configurations of those.

ABM TREATY

Senator EXON. Thank you. I have one last question, Dr. Cahn—and then we will have some other questions that we will ask you to answer for the record and the answers will be included in the record when they come back. We would ask you to do that as promptly as you conveniently can. How is the ABM Treaty, to use your words, the very foundation of any possible future progress in arms control?

There must be other avenues than that, but I take it that you think that the ABM Treaty is the centerpiece for the chance of further agreements. Is that correct?

Dr. CAHN. Yes, Senator, I do, particularly now that the U.S. Government is no longer in compliance with the SALT Treaty. I think that the ABM Treaty does remain the cornerstone of our arms control policies, and the Soviet Union has made it quite clear that we are not likely to get progress in the START negotiations and achieving that desirable goal of 50 percent reductions in the strategic offensive forces unless we come to an agreement on what abiding by the ABM Treaty means to both sides.

Senator EXON. Well, I would agree with you that the United States is no longer in compliance with SALT. And of course we are not because the President specifically said we were not when we didn't retire the Poseidons when we should have. But having said that, would you and I not agree that the Soviets have not remained in compliance with SALT either, have they?

Dr. CAHN. I do not believe that the Soviets were out of compliance with the SALT Treaty at the time we announced we would no longer comply with it.

Senator EXON. You do not think the encrypting of information on tests was a violation of the treaty?

Dr. CAHN. I think that that question is a difficult question to answer and there is legitimate difference of opinion within our intelligence community whether the degree of encryption is sufficient to diminish our observance of their staying within the treaty. Encryption was not forbidden in the SALT Treaty. They were forbidden from encrypting so as to disable our ability to see whether they are abiding by the treaty or not.

Senator EXON. Well, we may come at this from a slightly different view point, and we may come at it from slightly different sources of information, but I am not sure that I agree with you on that one point at least.

I appreciate very much your coming here this morning. It has been interesting testimony and we will look forward to the additional responses in writing to the questions that we will submit.

[Questions for the hearing record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

SBKKV PROGRAM

Senator EXON. While it is not a part of your presentation today, I would like to ask each of you for your best technical judgments regarding the ability of the SDI's current SBKKV system to achieve high probability of boost-phase intercept of Soviet missiles likely to be around by the time phase I of SDI is fully deployed.

Mr. HOFFERTH. McDonnell Douglas Astronautics Co. is not involved in any way with the SBKKV development program, so we do not have direct knowledge of how that program is progressing. We do understand the mission for SBKKV. The major technical challenge is to successfully home on the booster rather than the rocket plume with the SBKKV. It is our understanding that the Delta 181 mission provided valuable insight toward resolving this challenge. If that is true, there is reason to believe that the SBKKV can achieve a high probability of boost-phase intercept of Soviet missiles.

BATTLE MANAGEMENT RADAR

Senator EXON. In your briefing, your expanded system had five sites, each with a battle management radar. I have no doubt that would be a robust system. But if we let the Soviets have five more sites too, won't we really have to worry about a Soviet ABM breakout? All they need is lots of interceptors, produced covertly.

Mr. HOFFERTH. It is clear that if we make the decision to install the five sites along the coast that I spoke of, in addition to a site at Grand Forks, we must recognize that the ABM Treaty would have to be addressed. As you noted, Senator Exon, an accidental launch protection system "might be a relatively easy proposition to get them to agree on . . .".

The issue of Soviet breakout is a current concern and is not going to be caused by an ALPS. The Soviets currently have in production interceptors.

SOVIET SUBMARINE FORCE

Senator EXON. Under the kind of START agreement that seems to be shaping up, the Soviet submarine force structure will be significantly constrained. Their submarine force tends to operate out of northern bastions. Recently, the director of Naval Intelligence said that the Soviets had withdrawn their Yankees off the U.S. coasts. Do you expect there to be a close-in ballistic-missile submarine threat in the future? If so, might it be small enough that we could use traditional antisubmarine warfare measures to negate or control a small, close-in threat?

Mr. HOFFERTH. With regard to the current or future SLBM threat, it is important that we deploy a defensive system that can respond to that threat. It certainly is important that we have the best antisubmarine warfare capability that is possible. Given this ASW capability, if even one SLBM booster is launched before the submarine is destroyed, the reentry vehicles from that SLBM would cause major damage to our Nation. The defensive system should be able to counter all possible SLBM threat scenarios including the first launch.

SDI'S CURRENT SBI SYSTEM

Senator EXON. Mr. Loomis, while it is not a part of your presentation today, I would like to ask each of you for your best technical judgments regarding the ability of the SDI's current SBI system to achieve high probability of boost-phase intercept of Soviet missiles likely to be around by the time phase I of SDI is fully deployed.

Mr. LOOMIS. I respectfully prefer not to comment in detail, however it appears that the main utility of the Spaced Based Interceptor (SBI) weapon is in the boost phase, where it provides a leveraged kill factor against ICBMs prior to bussing.

ERIS FTV MISSILE

Senator EXON. You speak of the ERIS FTV missile being tested in 1990. Wasn't that supposed to fly in 1989, according to last year's SDI plan? Has the schedule slipped, and is that due to funding cutbacks or technical problems?

Mr. LOOMIS. The first ERIS flight is currently in 1990, and contractually has always been in 1990. Our initial proposal to the Army in 1985 offered flight tests beginning in 1989. However, fiscal year 1986 funding constraints limited first year efforts to a level that precluded a 1989 flight. Fiscal year 1988 funding constraints caused a program restructuring and a reduction in flight tests from five to three. Nonetheless, the first flight date has actually been accelerated rather than slipped. This was accomplished in part by compressing the test schedule and accepting additional development risk.

SOVIET SUBMARINE FORCE

Senator EXON. Under the kind of START agreement that seems to be shaping up, the Soviet submarine force structure will be significantly constrained. Their submarine force tends to operate out of northern bastions. Recently, the director of Naval Intelligence said that the Soviets had withdrawn their Yankees off the U.S. coasts. Do you expect there to be a close-in ballistic-missile submarine threat in the future? If so, might it be small enough that we could use traditional antisubmarine warfare measures to negate or control a small, close-in threat?

Mr. LOOMIS. The placement of a submarine off U.S. shores for a close-in missile attack appears to be a currently available Soviet military option which would remain technically feasible into the future. I would not care to speculate about the size of the close-in threat, or the current ability of our traditional antisubmarine warfare measures to negate or control the threat. However, I am aware of a program on the drawing board, although not currently funded, that would augment traditional antisubmarine measures with the ability to destroy an SLBM in the boost phase. The name of the program is Trapshot. It is being investigated by a sister division of Lockheed in Burbank. The system consists of a specialized radar installed on an ASW P–3 Orion aircraft and a suite of interceptor missiles which could be fired from the aircraft, in the event an SLBM is launched from a submarine being tracked.

Senator EXON. Dr. Cahn, under the kind of START agreement that seems to be shaping up, the Soviet submarine force structure will be significantly constrained. Their submarine force tends to operate out of northern bastions. Recently, the director of Naval Intelligence said that the Soviets had withdrawn their Yankees off the U.S. coasts. Do you expect there to be a close-in ballistic-missile submarine threat in the future? If so, might it be small enough that we could use traditional antisubmarine warfare measures to negate or control a small, close-in threat?

Dr. CAHN. It is possible that the number of Soviet missiles based on submarines in open-ocean areas may decline in the future. It is not likely, however, that the threat will disappear. In fact, several incentives will encourage the Soviets to preserve a number of shorter-range submarine-launched missiles aimed at the United States even if a START agreement were achieved. Based on the current negotiating positions of the two sides, a START accord would impose stricter constraints on the number of strategic warheads than on the number of strategic nuclear delivery vehicles. It could, therefore, encourage the Soviets to preserve some of their older submarines with relatively less heavily MIRVed missiles. Most importantly, the military rationale for the Soviets to deploy shorter-range submarine-launched missiles will remain very strong for the foreseeable future. Many strategic sites in the United States, including early warning and air defense radars, bomber bases, air bases for air defense forces, strategic command and control centers, and even naval ports can profitably be attacked by short-warning, close-in, submarine-launched missiles. In a crisis situation the current Soviet choice to devote more Yankee-class submarines to the European theater could easily be reversed.

Traditionally antisubmarine warfare (ASW) measures, no matter how effective, would not be useful in preventing an accidental or unauthorized launch from a Soviet submarine already based close to U.S. shores. Such ASW measures might be employed against a renegade Soviet submarine commander who broke away from normal deployment areas in order to launch a closer-in attack, provided the United States received warning in a timely manner. But that is not assured. In any event, an ABM Treaty-compliant Accidental-Launch Protection System could not protect against an unauthorized launch from a modern Soviet strategic missile submarine of the type deployed in Arctic bastions. Such an attack could amount to as many as 180 warheads, overwhelming a treaty-complaint defense.

The key political problem posed by deployment of an Accidental Launch Protection System will remain, therefore. A treaty-compliant deployment might satisfy constituents in Omaha, but not in Boston, Newport News, San Diego, or Charleston. Pressure will build for a larger-scale deployment, perhaps as large as the six-site 700-interceptor deployment that McDonnell Douglas is proposing. Such a deployment, when matched by the Soviets, would erode any confidence either party could have in the ABM Treaty's barriers against such an ABM break-out.

ACCIDENTAL LAUNCH PROTECTION SYSTEM

Senator Exon. You say in your statement that "noone has described in concrete terms the alleged advantages of operational experience with a limited ABM system." I agree that the case has not been made yet, but wouldn't you agree that the history of the introduction of lots of different kinds of advanced technology from internetted telephone, computer, and electric power distribution systems to nuclear reactors and manned space launches tends to support early operational experience?

Dr. Cahn. Presumably an operational Accidential Launch Protection System would require little maintenance. The only real "operational" experience the United States could have with ABM systems would come from a vigorous testing program at ABM test ranges. The United States can carry out a vigorous testing program without deploying a limited system, however. In any event, it would take 10 years or more for the United States to build a nationwide ABM system, providing plenty of time to perfect the technology and train personnel. No one would deny that the United States might learn some useful lessons by operating a limited ABM system, but it is hard to see how such lessons could be worth $5 to $15 billion. The advantages of operational experience with an ABM system are often assumed—they have not been concretely described.

Questions Submitted by Senator Carl Levin

BALLISTIC MISSILE DEFENSE

Senator Levin. I have read your prepared statement, and if I am reading you correctly, you are saying that an ABM Treaty compliant ALPS deployment would not provide an effective defense against:

A. an accidental or unauthorized launch of an SLBM fired from a position off either coast,

B. an accidental or unauthorized attack on targets along either coast,

C. an unauthorized launch of more than a few MIRV'd ICBMs or SLBMs, regardless of their location.

That leaves only a defense of some of the United States against an accidental or unauthorized launch of a small number of ICBMs or SLBMs located in or near the Soviet Union.

Given our tight defense budget situation and the likelihood of such an accidental or unauthorized launch, do you believe it is worth $8 billion to acquire that capability?

Mr. Hofferth. MDAC is currently involved in the HEDI program, and as a contractor we have been involved in ballistic missile defense work for over 30 years. From this background of experience, we can give expert testimony as to what can be done from a technical point of view, and we can make estimates for the cost of various system elements. From this data, we can give you information on the cost effectiveness of various potential ALPS architectures. Our examination of possible ALPS architectures was prompted by Senator Sam Nunn's speech to the Arms Control Association. We accepted from his comments that there was a concern about accidental and unauthorized launches, and on this basis we proceeded with our study. We do not presume, as a contractor, to suggest or make policy judgments concerning these systems.

COST OF ABM TREATY COMPLIANT SYSTEM

Senator LEVIN. Your prepared testimony provides a cost estimate for an ABM Treaty compliant system (100 launchers at Grand Forks, ND) of $8 billion. You also describe a more elaborate system that would provide a defense of the coasts, and at least theoretically, against SLBM attack from the Atlantic or Pacific.

Mr. HOFFERTH. We believe that each of the five coastal sites which were described will cost $2.5 billion to $3 billion. If we use the $3 billion figure for each of the five sites, they would cost a total of $15 billion. If the higher $10 billion figure for Grand Forks is used (a figure suggested in the written statement), the total cost for the six sites would be $25 billion.

TARGETS ALONG COASTS

Senator LEVIN. In your prepared statement you note that "We are continuing our analysis to define how much of the United States can effectively be covered from the single site at Grand Forks, but we have done enough to feel that some, if not all of the east and west coasts cannot be covered effectively."

Putting aside the question of an accidental launch for a moment, aren't targets along the coasts (major cities) likely to be the targets of an unauthorized Soviet launch or a deliberate third party attack?

Mr. HOFFERTH. We do indeed agree that targets in the coastal areas, including major cities, would be prime targets for an unauthorized or "Nth" country attack. It is concern for the vulnerability of these targets, in particular to the SLBM threat, that we propose HEDI in any ALPS scenario, since HEDI has a unique capability against the near in launched, lower profile trajectory SLBM.

NATIONAL ASSETS

Senator LEVIN. You displayed a chart (viewgraph 10) which showed the extent of "national assets" located within 300 miles of each coast.

If the threat we are addressing is either accidental, unauthorized, or third party launch, why have you only assessed "militarily significant" national assets? It seems to me the threat might most likely be aimed at urban areas. Why would an unauthorized attack be launched against sub ports, SAC capable airfields, etc.?

Mr. HOFFERTH. We agree that major urban areas in the coastal region would be prime targets. Viewgraph 10 reflects the military assets because that is the way we have defined the target set in past studies. We used this data to make the point that a significant portion of our national assets are located in the coastal region. The inclusion of the major urban areas in this set of military targets would serve to further emphasize this point.

ERIS SYSTEM

Senator LEVIN. Do you agree with the President's science advisor's (William Graham) assessment that an ERIS system at Grand Forks would not protect the country "west of the Sierras and east of the Appalachians"? Is that a fair characterization of the treaty compliant system you have presented here today?

Mr. HOFFERTH. We have not completed our analysis of how much of the United States could be defended from a single site at Grand Forks. The coverage that can be achieved will depend upon the threats that are assumed, the sensors that are utilized, the level of interceptor performance that is used and the timelines of the launch decision. We are continuing to analyze those variables now. It is our feeling, based on the work we have done, that for some threats, we will not be able to defend the coastal areas from the single Grand Forks site with any interceptor we have described in this presentation. Dr. Graham's statement reflects a similar conclusion.

STRATEGIC WEAPONS

Senator **Levin**. Gentlemen, both your companies do extensive offensive strategic weapons work too. Assume for a moment that we were to amend the ABM Treaty so as to permit the deployment of your more extensive system of 800 launchers at 6 sites, and the Soviets deployed such a system of their own as they would then be allowed to do under the treaty.

How do you think their system would effect our ability to retaliate effectively following a Soviet first strike on the United States?

If they decided to use their deployment of 800 launchers at six sites for the defense of specific, high value targets would their system make effective U.S. retaliation more difficult?

How would such a Soviet system affect U.S. retaliatory capability if both sides were to cut their offensive forces 50 percent under START?

Mr. **Hofferth**. The way this question is worded, it is assumed that the consideration of accidental or unauthorized launch is set aside, and the concern addressed in the questions is related to a full strategic force exchange.

It is reasonable to believe that the Soviet would select their six sites to maximize the coverage of high value targets. We would have to assume that a maximum of 800 of our retaliatory RVs would be killed and that we would structure the overall retaliation to achieve the military objectives even with the loss of these RVs. Introductions of a more extensive defensive system would likely add complexity to a Soviet target planner's problem of structuring a first strike. One must continue to note the robustness of the Soviet SDI program as well as the major benefits to U.S. security of having an operational defensive system.

Senator **Levin**. Gentlemen, both your companies do extensive offensive strategic weapons work too. Assume for a moment that we were to amend the ABM Treaty so to permit the deployment of your more extensive system of 800 launchers at six sites, and the Soviets deployed such a system of their own as they would then be allowed to do under the treaty.

SOVIET FIRST STRIKE

How do you think their system would effect our ability to retaliate effectively following a Soviet first strike on the United States?

Mr. **Loomis**. A defense force of 800 launchers could effectively be used to preferentially defend our Minuteman/Peacekeeper forces against a Soviet first strike. This would ensure the survival of the nuclear forces required to successfully retaliate against the Soviet Union (i.e. Mutual Assured Destruction). A Soviet 800 launcher defense force would not be sufficient to effectively prevent our retaliatory attack.

Defense, therefore, increases stability. It deters a first strike and permits an effective retaliatory attack.

Lockheed is undertaking a study to quantitatively analyze the overall stability equation. It is a topic that requires sophisticated assumptions to gain insight into the problem. It includes estimating capability levels of all the strategic areas, for both the U.S. and the Soviets, as well as force structure and attack scenarios.

U.S. RETALIATION

Senator **Levin**. If they decided to use their deployment of 800 launchers at six sites for the defense of specific, high value targets would their system make effective U.S. retaliation more difficult?

Mr. **Loomis**. If the Soviets elected to use their 800 launcher defense system to defend selected hard targets, and the U.S. elected to use a Mutual Assured Destruction policy by retaliating against Soviet population centers, the Soviet defense system would be ineffectual. Again, U.S. defense of strategic assets would enhance stability.

EFFECT OF 50 PERCENT CUT UNDER START

Senator **Levin**. How would such a Soviet system affect U.S. retaliatory capability if both sides were to cut their offensive forces 50 percent under START.

Mr. **Loomis**. Depending on the size of the offensive forces before the cut, and some other not so obvious assumptions on force structure, a 50 percent cut in offensive forces would have a positive leveraging effect for the defense. In other words, the 800 launcher defense would normally be more effective against the smaller offense. Even after a 50 percent reduction in offensive forces, an 800 launcher defense would probably not be effective for general population protection, preserving the deterrent utility of a Mutual Assured Destruction retaliation policy. If in the future, however, a breakthrough in antisubmarine warfare place submarine based nuclear forces in jeopardy, a severe unbalanced situation could result that would make a defense extremely effective, or the absence of a defense extremely threatening.

A destabilizing situation could occur if an offensive reduction provides one side with an unbalanced defense/offense capability compared to the other. A continued Soviet offensive buildup, unanswered by either U.S. offensive or defensive measures will provide the Soviets military superiority and the capability to negate our ability to retaliate by destroying our command and control centers and nuclear forces.

ABM DEPLOYMENT

Senator LEVIN. Ms. Cahn, you noted on page 8 of your prepared statement that "The strength of the case for a limited ABM deployment, therefore, depends on how we assess the need for limited protection of the country against a very small missile threat, and the chances that a treaty-compliant ABM deployment can offer such protection."

First, how serious is the threat of an accidental or unauthorized launch?

Second, if we deem it to be a serious threat, is an ABM system the most cost effective means of addressing it?

Third, can an ABM Treaty compliant system address that threat, and if not, what other effects would either alteration of, or withdrawal from, the ABM Treaty have on our security?

Dr. CAHN. How serious is the threat? The threat of an accidental or unauthorized launch of missiles aimed at the United States is not, in my view, as large a danger as it sometimes would appear in the public mind. It is not a simple matter to launch a missile, especially a liquid-fueled missile like the Soviet SS–17, SS–18, or SS–19. In more than 30 years of experience with intermediate- and long-range missiles, neither the United States nor the Soviet Union, as far as we know, has experienced an accidental or unauthorized launch. This is not to say that an accidental or unauthorized launch is impossible—but in the hierarchy of dangers against which the United States should try to defend, it ranks relatively low.

Is an ABM system the most cost effective means of addressing the threat? To the extent that one regards accidental or unauthorized launches as a threat, it is inconceivable that one cannot find a more cost effective response than deployment of an ABM system. Alternatives could include installation of permissive action links on all U.S. and Soviet strategic missiles or installation of in-flight destruct or in-flight arming mechanisms on missiles (see below).

Can an ABM Treaty-compliant system address the threat? A treaty-compliant deployment of an ABM system would not defend effectively against a large-scale unauthorized launch that could involve as many as 100 ICBM warheads, or 180 SLBM warheads, and it would not defend coastal areas against missiles from Soviet submarines deployed in open-ocean areas. A larger ABM system designed against the unauthorized launch threat would require modifying the ABM Treaty at least to allow more interceptor missiles. A full-scale unauthorized launch protection system that would defend against the open-ocean submarine-based missile threat might require a system at least as elaborate as the six-site, 700-interceptor deployment that McDonnell Douglas has proposed. Deployment of such a system would virtually destroy the ABM Treaty, since it would effectively eliminate the treaty's barriers against an ABM breakout. The ABM Treaty is and for the foreseeable future will remain the foundation of negotiated arms limitations. Without an effective ABM Treaty, both the United States and the Soviet Union would want to preserve the option to build up offensive weapons in order to overcome the other side's prospective defenses. Thus, without a strong ABM Treaty, neither the United States nor the Soviet Union will be able to agree to significant constraints, let alone reductions, in strategic offensive systems.

MISSILE COMMAND AND CONTROL SYSTEMS

Senator LEVIN. You noted in your statement the possibility of engaging in discussions of missile command and control systems with the Soviets, and suggested two possible alternative means of addressing the accidental/unauthorized launch threat:

A. the placing of permissive action links (PALs) on all U.S. and Soviet warheads, and,

B. an agreement to equip missiles with in-flight destruct mechanisms.

Could you elaborate on those proposals for us? Has any serious work been done that you know of on how we could jointly install inflight destruct mechanisms without endangering the deterrent value of our missile systems?

Dr. Cahn. The United States currently employs permissive action links (PALs) on all of its land-based strategic missiles and on nuclear weapons on bombers, but not on naval nuclear weapons. In the past, the United States has offered to share extensive information about PALs with the Soviet Union, but Soviet officials declined the offer, saying that they were sufficiently familiar with the technology. This might be taken as an indication that the Soviets employ similar systems for control over nuclear weapons, but no detailed information about their technology is available publicly. This would seem to be a fruitful area for more extensive official discussions between the United States and the Soviet Union. Permissive action links should act as an effective barrier against accidental or unauthorized missile launches. If the U.S. Government is concerned about the threat of such missile launches, one of the first steps it should consider is to deploy PALs on naval weapons and seek more information from the Soviets concerning their own strategic control systems.

The Government might also consider proposing that the United States and the Soviet Union deploy either in-flight destruct mechanisms or in-flight arming or disarming devices on strategic missiles. I am not aware of any official studies of such proposals, but Dr. Richard Garwin has written rather extensively about the technical and strategic issues involved. [See Richard L. Garwin, "Launch Under Attack to Redress Minuteman Vulnerability?" *International Security*, Vol. 4, No. 3, (Winter 1979/80).] Both the United States and the Soviet Union currently employ in-flight destruct mechanisms on space-launch vehicles and on military missiles during test flights. If a similar destruct mechanisms were installed on strategic missiles and controlled by encrypted commands from a number of dispersed control centers, missiles launched accidentally or without authority could be destroyed in flight. In-flight devices to disarm nuclear warheads could be controlled in the same fashion. Alternatively, missiles could be equipped with devices that would arm nuclear weapons during missile flight. A large number of dispersed communications terminals could be deployed. An encrypted message from any one of the terminals would arm all missiles after launch.

Deterrence should in no way be damaged by either approach. Destruct or disarm commands could be issued only with some kind of fail-safe procedures, and it could be arranged that no one command center could destroy or disarm all missiles. Modern cryptology ensures that the Soviets could not break the code and destroy U.S. missiles in flight. (Nor could the United States break the Soviet code.) Commands to arm warheads could not be disrupted if issued from multiple terminals. The technical problems posed by such approaches appear to be quite minimal, and the cost very small.

Questions Submitted by Senator Strom Thurmond

CHANGES IN ABM TECHNOLOGY

Senator Thurmond. Could the witnesses please tell the committee what changes have occurred in ABM technology since 1969 that makes ABM defenses feasible today. Please address both ERIS and HEDI as well as space-based systems.

Mr. Hofferth. With regard to the advances in technology since 1969 that make the ERIS, HEDI and space based interceptors feasible today, there are several:

(a) All these interceptors use homing guidance techniques that were not available in 1969. Each interceptor must receive initial target vector information from a radar or infrared acquisition sensor, but once launched with this initial information, the interceptor will home very accurately to hit and kill its target.

(b) With the very accurate homing guidance techniques that are now available, kill of the RV target can be achieved with the kinetic energy of the colliding masses. The interceptor does not carry a nuclear warhead to kill the RV as was the case in 1969.

(c) Miniaturization of electronic components, and advances in material and fabrication techniques, which permit the design of small, light-weight and less costly interceptors.

(d) Computers are now available that have very high throughput, and they can be packaged in small volumes and are light weight. This capability permits tracking of large numbers of objects (RVs) by both the infrared and radar acquisition sensors. With these computers, we can discriminate RVs in real time with radar. It is reasonable to expect that we will demonstrate exoatmospheric discrimination in the not to distant future.

(e) The ability to activate a radar from a low power dormant state and bring it on line to establish tracks on objects and then discriminate the RVs has been demonstrated. The operational ERIS and HEDI interceptors would be designed for low maintenance, and include provisions such that they would be activated electronically for launch without need for manual involvement. These capabilities were not available in 1969.

ERIS AND HEDI SYSTEMS

Senator THURMOND. Could the witnesses please tell the committee how ERIS and/or HEDI would affect or complement the Phase I program of SDI?

Mr. HOFFERTH. The ERIS interceptor is included as one of the Phase I elements, so its use in an ALPS scenario would simply be a step toward its expanded use in a future Phase I. HEDI, while it was not included as one of the six Phase I elements, was listed as an option in Phase I because of its unique capabilities against the SLBM. So like ERIS, if HEDI were used in an ALPS scenario it would be a precursor to its potential use in a Phase I architecture.

The deployment of both systems, in fact, the deployment of the entire ALPS architecture I have described could have a very positive affect on SDI Phase I and future phases. We would gain valuable, hands on experience with the development, testing, integration, fielding and operational support of a two-layered defensive system. The experience gained could help with overall SDI deployment should that become a reality. I would point out that the Soviets have many years of experience with an ABM system around Moscow that is similar to the one I've proposed.

CHANGES IN ABM TECHNOLOGY

Senator THURMOND. Mr. Loomis, could the witnesses please tell the committee what changes have occurred in ABM technology since 1969 that make ABM defenses feasible today. Please address both ERIS and HEDI as well as space-based systems.

Mr. LOOMIS. In efforts to keep my response concise, I will cover only those technology areas related to the ERIS mission. The one biggest event since 1969 in the area of exoatmospheric interceptors was the Army/Lockheed successful Homing Overlay Experiment (HOE) intercept and destruction of a mock RV on June 10, 1984. This event in fact validated the concept and the technologies associated with acquisition, tracking, discrimination, designation, and homing to intercept of a cold target in space. This was accomplished, in addition to the hard work of many brilliant people, by technology advancements in the areas of both computers and LWIR seekers. Application of this technology in 1978 made it possible to guide the interceptor to a body-to-body impact with the RV in spite of closing velocities in excess of 20,000 mph. In 1988, 10 years later, we are able to accomplish the same outcome using much less expensive, more reliable hardware. This is possible due to technology advancements, lessons learned from other programs, and by utilizing software/computer resources optimally to integrate low-cost hardware components. Additionally, the technologies chosen offer the lowest life cycle cost benefits for a deployed system by reducing to a minimum the O&S costs of the interceptor.

Several advancements have also been realized in the interceptor precommit sensor area. Development of wide-field-of-view optics and LWIR focal planes (detectors) has provided the opportunity to deploy an LWIR precommit sensor able to acquire, track, discriminate, and handover targets to the interceptor. These systems (discussed in my testimony as PROBES) offer an alternative or supplement to radars as the sole means of performing the advanced targeting for the interceptor.

ERIS AND HEDI SYSTEMS

Senator THURMOND. Could the witnesses please tell the committee how ERIS and/or HEDI would affect or compliment the Phase I program of SDI.

Mr. LOOMIS. ERIS is, of course, one of the six systems contained in the Phase I program. The Phase I ERIS configuration is somewhat more optimized for size, power consumption and producibility than the configuration we assumed for ALPS. Life cycle cost considerations are critical when considering the interceptor quantities discussed in Phase I. However, functionally the two configurations are identical. I believe the Phase I System Concept Paper states, when discussing ERIS IOC dates, that a much earlier IOC date could be achieved if a decision were made to base an early deployment design on the ERIS FTV design. That's exactly what we have done for our ALPS concept. Any ALPS ERIS interceptors deployed early would be completely interoperable with the Phase I ERIS interceptors, the only difference being the initial acquisition and O&S costs would be greater for the ALPS configuration.

CHANGES IN ABM TECHNOLOGY

Senator THURMOND. Dr. Cahn, could the witnesses please tell the committee what changes have occurred in ABM technology since 1969 that makes ABM defenses feasible today. Please address both ERIS and HEDI as well as space-based systems.

Dr. CAHN. The main technical progress in ABM-related technologies since the late 1960s has been in improved accuracy and miniaturization of guidance systems for ABM interceptor missiles. There has also been some progress in developing optical sensors to track missiles in the boost phase and to supplement radars in tracking warheads in the midcourse and terminal phases. More accurate ABM warheads may allow exoatmospheric interceptors to destroy their targets by direct impact, without employing a nuclear warhead (it remains to be seen whether endoatmospheric interceptors, such as HEDI, can function without nuclear warheads—they will almost certainly require nuclear warheads if faced with maneuvering reentry vehicles). Smaller, lighter warheads will permit construction of longer-range and higher-acceleration interceptor rockets at lower cost.

These developments are not sufficient, however, to make ABM defenses more "feasible today" in any militarily meaningful sense, than they were in the late 1960s. Today, as 20 years ago, it would be technically "feasible" to develop and deploy within a few years an ABM system using ground-based interceptor missiles (either ERIS or ERIS plus HEDI) guided by ground-based radars. Such a system could intercept a few incoming warheads. The one difference would be that a more modern system using longer-range interceptors would have a larger defensive footprint, making defense against a few warheads coming over the North Pole possible from a single ABM deployment site. But an ABM system using contemporary ground-based technologies could still be overwhelmed by relatively far less expensive increases in the size of the attacking Soviet force; it could still be defeated by relatively simple and inexpensive countermeasures, such as chaff and decoys; and it would still be vulnerable to "structured" attacks that might destroy the radars or other key components.

A system using space-based interceptor missiles (SBI) would be rendered obsolete before it could be deployed by the evolution of Soviet missiles forces toward faster-burn boosters such as the SS-24 and SS-25 that are currently entering the Soviet force.

Senator EXON. Thank you, and we are adjourned.

[Whereupon, at 11:31 a.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

TUESDAY, MARCH 22, 1988

U.S. Senate,
Subcommittee on Strategic Forces
and Nuclear Deterrence,
Committee on Armed Services,
Washington, DC.

ICBM MODERNIZATION PROGRAMS AND STRATEGIC WARNING INDICATORS

The subcommittee met in executive session, at 2:10 p.m. in room S-407, the Capitol, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Levin, Glenn, and Cohen.

Staff present: Robert F. Bott, William E. Hoehn, Jr., Ronald F. Kelly, and T. Kirk McConnell, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Gregory J. Weaver, assistant to Senator Levin; Milton D. Beach, assistant to Senator Glenn; Thomas Scott Bunton, assistant to Senator Wirth; James M. Bodner, assistant to Senator Cohen; Mark J. Albrecht, assistant to Senator Wilson.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator Exon. The subcommittee will please come to order. The Subcommittee on Strategic Forces and Nuclear Deterrence meets this afternoon for the eighth hearing in its schedule of hearings regarding the fiscal 1989 budget. The subcommittee will hear today about the ICBM modernization program in the Air Force.

As most of the members are aware, Secretary Carlucci announced earlier this year that the DOD believed that the Small ICBM (or Midgetman) program should be terminated, but that $200 million would be required in fiscal year 1989 funds in order to provide the option for the next President to decide whether or not to terminate the program finally.

The administration also announced that a deployment decision for the Rail-Garrison MX would be left for the next President. The fiscal year 1989 budget request does allow for full-scale engineering development for the Rail-Garrison MX concept.

I emphasize this background because today's lead witness is Brig. Gen. Charles May from the Air Force, which is responsible for managing the two programs, given these OSD decisions as to funding.

Our purpose in this first part of the hearing is to hear in detail what the requested funding levels, if approved by this committee, would achieve for both the Rail-Garrison MX and the Small ICBM.

In other words, if you do not like the answers you hear, do not try to shoot the messenger.

Members should be aware that I have asked General May to emphasize what is new since last year in the operational concept for the Rail-Garrison MX and to try to lay out for us what the fiscal year 1988 and fiscal year 1989 funds proposed for the Small ICBM will accomplish, given OSD's direction to the Air Force.

Following General May's presentation, we will have one round of questions under the 5-minute rule. After that round of questioning is completed, our second witness, Maj. Gen. Bill Doyle, will present a codeword level briefing on SAC's strategic warning indicator systems. Staff access will have to be restricted at that point.

Following General Doyle's briefing, we will return to the questioning of both witnesses. In addition, I note the presence of both Hon. John Welch, Assistant Secretary of the Air Force for Acquisition, and his Military Deputy for Acquisition, Lt. Gen. George Monahan, both of whom are vitally concerned with ICBM modernization issues.

Following General Doyle's presentation, I shall invite both Mr. Welch and General Monahan to join General Doyle and General May at the witness table for further questions by the committee, should they wish to enter into that difficult fray.

Before we proceed with General May's presentation, let me first invite any members of the committee who have opening statements or comments to make. Senator Glenn.

Senator Glenn. No.

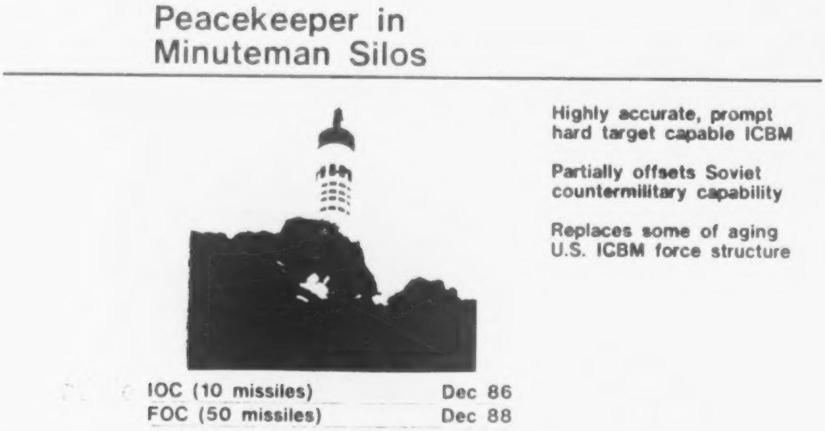
Senator Exon. If Senator Glenn has no comment, General May, we will ask you to proceed at this time.

STATEMENT OF BRIG. GEN. CHARLES A. MAY, U.S. AIR FORCE, DEPUTY DIRECTOR OF STRATEGIC SPECIAL OPERATIONS FORCES AND AIRLIFT PROGRAMS

General May. Thank you, sir. It is a pleasure to return before your committee.

U.S. ICBM MODERNIZATION PROGRAM

As you said in your opening remarks, I am going to review what is new in the ICBM modernization program and also talk in some detail about the ops concept for Rail Garrison, as well as the decision that the Secretary of Defense has reached pertaining to the small missile program.



Peacekeeper in Minuteman Silos

Highly accurate, prompt hard target capable ICBM

Partially offsets Soviet countermilitary capability

Replaces some of aging U.S. ICBM force structure

IOC (10 missiles)	Dec 86
FOC (50 missiles)	Dec 88

First, just as a point of departure, to talk about Peacekeeper in Minuteman silos, primarily because the missile is government-furnished equipment to the Rail Garrison program. So just to make sure that the committee understands where we are in this program, we met our IOC, as you are well aware, 1½ years ago. And we are continuing to move toward the full operational capability, missiles turned over to the Strategic Air Command at Warren Air Force Base, in December of this year.

Senator EXON. Any problems that we have had at all in that, General?

General MAY. Sir, we have the continuing challenge of getting sufficient missile guidance and control systems to the deployed force at Warren, and today's figures are that we basically have 35 missiles turned over to the Strategic Air Command.

Twenty-two of those are on hard alert committed to the SIOP on a daily basis, and the other missiles are capable of being generated to SIOP status. And we normally have six spare MGCSs, missile guidance and control systems, there at Warren.

And we have additional systems available to us through our repair facilities, and it would take some hours, perhaps days, to bring those missiles to full readiness.

Senator EXON. How many are ready to go right now?

General MAY. Twenty-two is the current figure, sir.

Senator GLENN. May I ask a question, Mr. Chairman?

Senator EXON. Sure.

MISSILE GUIDANCE SYSTEM

Senator GLENN. We have heard all sorts of reports about the guidance system and problems with it. The ones that are sitting there on alert right now ready to go, what is the status of their guidance system and what kind of CEPs do we have?

General MAY. Sir, in our judgment the Peacekeeper missiles on alert at Warren are the most accurate missile systems in the world. The specified capability to achieve 3 to 5 years after initial operational capability we are talking about 1991—was a [deleted].

Our demonstrated accuracy over the 17 test flights that we have had is a [deleted].

So at this point in time, we are [deleted] better than the specification that we are not required to reach until December 1991.

Senator GLENN. Then what is the problem with the guidance system?

General MAY. Sir, the fundamental problem with the guidance system is delivery of new builds by the manufacturer, Northrop Electronics Division. That is what started the problem.

Today we continue to have challenges with repairing the assets that we have in the system, and the basic challenge with repairing the assets has to do with the fact that Northrop, because they are behind in building new units, are not able to build the spare parts that are required to repair the assets that fail.

As you know, unlike the Navy, the Air Force turns on a missile guidance and control system and it runs until it fails. So we expect to have all of the units fail several times during their life.

The challenge is to keep that failure rate lower than the mean time between failures that we programmed for the system. In the case of the IMU, that program today is 5,300 hours. The demonstrated capability is 7,600 hours. So the system is performing. The IMU itself is performing much better than we expected it to perform at this point in the development process.

Peacekeeper in Minuteman Silos

FY89 RDT&E
$40.0

Sys engineering/ test	22.5
Engineering support	15.5
Guidance/control	2.0

[redacted]

FY89 Wpn Sys
$807.0

Flyaway	754.9
Support	52.1

($ in Millions)	FY88 PB	FY88 Crnt	FY89 PB	FY89 Amd	to Finish	TOTAL
RDT&E	51	36	40	40.0	TBD	TBD
Weapon System	1260	864	1359	807.0	TBD	TBD
Quantity Buy	21	12	21	12	TBD	TBD

Sir, this is what we are asking for in the Peacekeeper in Minuteman silo program. We will complete in fiscal year 1989 our development testing. We have 3 additional development test flights to complete our 20 flight program, and we will be asking the Congress to procure 12 missiles in fiscal year 1989.

Peacekeeper Rail Garrison

Scowcroft R&D program

Dec 86 Presidential decision to begin development on rail garrison

Schedule **Development continues on rail garrison** **FY 88**

Peacekeeper in Rail Garrison. As you know, the Congress authorized development on this program last year, and the fiscal year 1989 funding continues that development process.

And we anticipate that we will get approval from the Office of the Secretary of Defense to go into full-scale development some time this spring.

Peacekeeper Rail Garrison

FY89 RDT&E
S792.9

Sys rqmts analyses

Design reviews (SDR, PDR)

Dev prototype train

Subsystem test & integration

Siting/environmental studies

($ In Millions)	FY88 PB	FY88 Crnt	FY89 PB	FY89 Amd
RDT&E	591	350	1193	792.9

These are the dollars associated with the program. This is the mark that we had last year, $350 million, and we are asking for just slightly less than $800 million in fiscal year 1989. The total bill for RDT&E in the program is under $3 billion.

PEACEKEEPER RAIL GARRISON
EIS STRATEGY AND MILESTONES

- PUBLISH NOTICE OF INTENT TO ACCOMPLISH EIS - JAN 88 (THIS BEGINS THE PUBLIC/POLITICAL PROCESS)
- HOLD SCOPING MEETINGS - FEB & MAR 88
  - IN 11 DEPLOYMENT LOCATIONS (IN 9 STATES)

- FILE DRAFT EIS - JUN 88
- CONDUCT PUBLIC HEARINGS (IN SAME LOCATIONS AS SCOPING MEETINGS) - JUL & AUG 88
- BRIEF SECAF THROUGH AF BOARD STRUCTURE TO IDENTIFY PREFERRED ALTERNATIVE - OCT 88
- FILE FINAL EIS - DEC 88
- FINAL DECISIONS TO BE MADE BY SECDEF - EARLY 1989

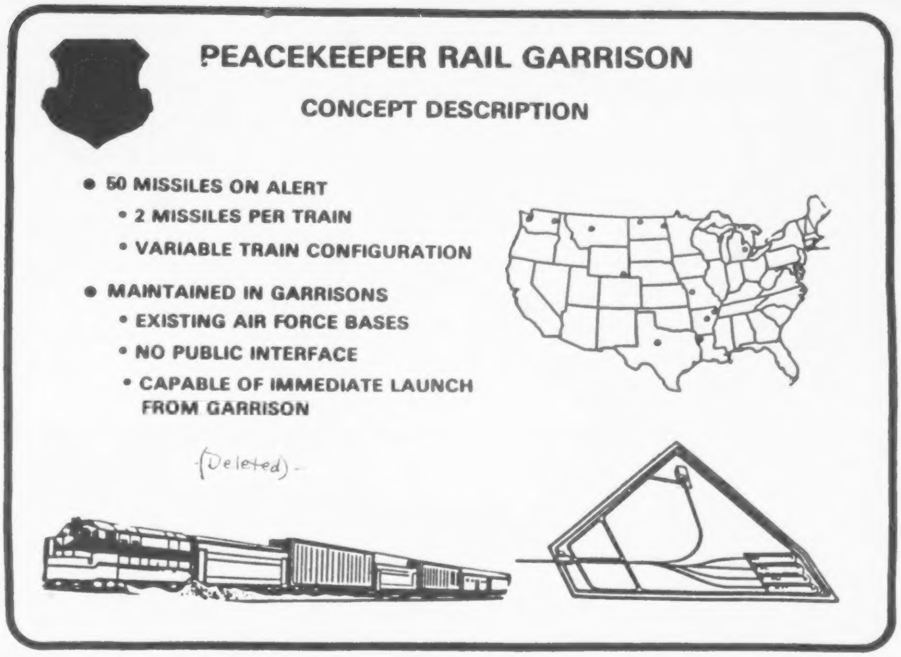
Sir, before we get into the operational concept, I would like to briefly tell you where we are in complying with the National Environmental Protection Act and accomplishing the environmental impact statement. This slide pretty well covers the details.

We are at this point beginning to hold scoping meetings. The first two scoping meetings were held in the Northwest at the Grand Forks Air Force Base and at Minot Air Force Base, and we had a large attendance in both cases from community leaders.

We are going to hold our third meeting tonight at Cheyenne, WY, to continue the exploration with the citizens as to the issues that they want considered in the environmental impact statement.

To date, we have had some people who have taken exception to the program, but the kinds of exceptions that they have taken are the kinds of exceptions that have been taken pertaining to Peacekeeper in Minuteman silos, and so forth.

There was not a large outcry opposing the program. In fact, the majority of the citizens in the two hearings to date were fully supportive of this particular basing effort.



PEACEKEEPER RAIL GARRISON

CONCEPT DESCRIPTION

- 50 MISSILES ON ALERT
  - 2 MISSILES PER TRAIN
  - VARIABLE TRAIN CONFIGURATION
- MAINTAINED IN GARRISONS
  - EXISTING AIR FORCE BASES
  - NO PUBLIC INTERFACE
  - CAPABLE OF IMMEDIATE LAUNCH FROM GARRISON

(Deleted)

Sir, as you know, the basic concept description is to have 50 missiles on alert, two missiles per train. For costing purposes today, we look at seven Strategic Air Command bases. The major change from the systems that we have conceived before is that we will maintain these trains in garrison 24 hours a day.

To train the crews, we will use training trains and move those out on the Nation's railroad system. But we will not take either the missile or the nuclear warheads. There will be no public interface in day-to-day alert. They will be in garrisons, and those garrisons, as you see here pictorially on the slide, are very similar to the garrisoning around our weapons storage areas that we have at each one of our Strategic Air Command bases.

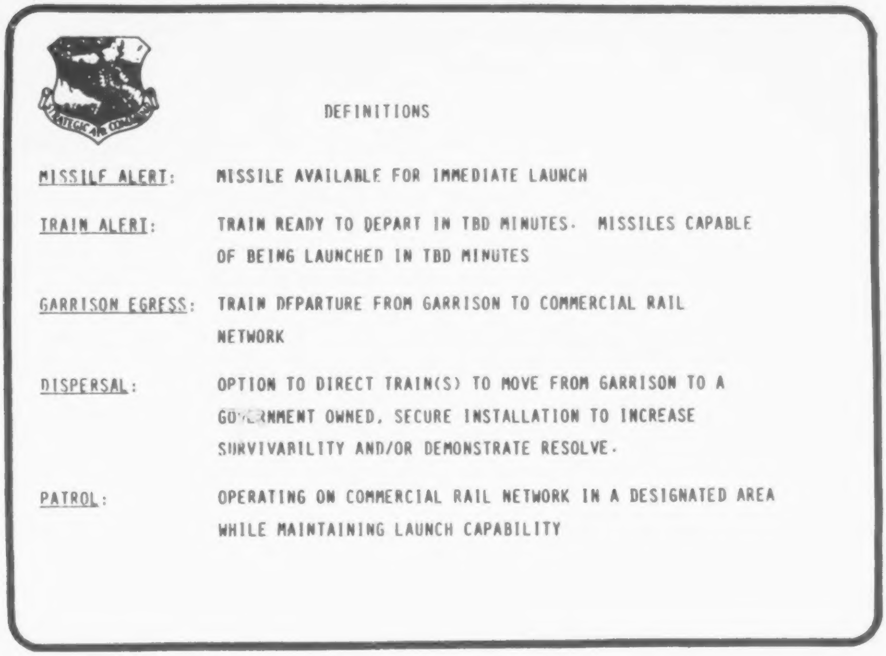
We are very confident that we understand the security requirements associated with the garrisoning concept. It is important to keep in mind that those missiles, especially when viewed from Moscow, when viewed by the Soviet planner, are continuously on alert.

They have exactly the same capability in terms of threatening targets in the Soviet Union as silo-based systems. [Deleted] is the basic concept, and that is the basic change from systems that the Air Force had considered in the past.

Those systems, as you recall, were to be involved with some sort of continuous mobility. This system, primarily because, number one, we do not have a validated threat at this point in time, second we are concerned about safety and nuclear surety, and therefore we have concluded that garrisoning these missiles is the appropriate basing option.

However, on strategic warning or, as General Welch refers to it, in time of national need, a decision would be made at the highest levels of government to disperse one or more of the trains.

And as you are well aware, we have that capability today [deleted] to disperse bombers and to disperse submarines. We see the same concept applying to Rail Garrison and, even more important, the same rigid command and control procedures that go to the various highest levels of the Government being involved in any decision to move the trains out on the rail.



DEFINITIONS

MISSILE ALERT:	MISSILE AVAILABLE FOR IMMEDIATE LAUNCH
TRAIN ALERT:	TRAIN READY TO DEPART IN TBD MINUTES. MISSILES CAPABLE OF BEING LAUNCHED IN TBD MINUTES
GARRISON EGRESS:	TRAIN DEPARTURE FROM GARRISON TO COMMERCIAL RAIL NETWORK
DISPERSAL:	OPTION TO DIRECT TRAIN(S) TO MOVE FROM GARRISON TO A GOVERNMENT OWNED, SECURE INSTALLATION TO INCREASE SURVIVABILITY AND/OR DEMONSTRATE RESOLVE.
PATROL:	OPERATING ON COMMERCIAL RAIL NETWORK IN A DESIGNATED AREA WHILE MAINTAINING LAUNCH CAPABILITY

Just some definitions quickly, sir. I know there is a lot on this slide, but I just want to point out a couple of things because when we go into the ops concept we will be dealing with these terms. "Missile alert" means that the missiles are on alert 24 hours a day.

As you know, the bombers are on alert, but the bombers sitting in their alert facility do not hold at direct risk targets in the Soviet Union, whereas these missiles, in the same fashion as missiles in silos, do hold targets at risk in the Soviet Union. And I will explain why I bring that up on a later slide.

"Train alert" means that we have the full complement of the crew on board the train or in the garrison area ready to respond within these time lines. Now, those time lines are somewhat arbitrary.

We could man in time of national need, in time of increasing tension, to reduce these time lines considerably. The basic time line is [deleted] and [deleted] is the time that it takes to start the diesel and to move out of the garrison onto the Nation's railroad system.

We could have one or all trains in that configuration, but for costing purposes, for manning purposes, given the normal day-today situation that we face in the international arena, our plan is to have [deleted]—very comparable to having approximately [deleted] percent of our subs at sea or [deleted] percent of our bombers on alert. We could put [deleted] percent of our bombers on alert if the threat required or if we wanted to pay the bill, and there is a considerable associated with doing that.

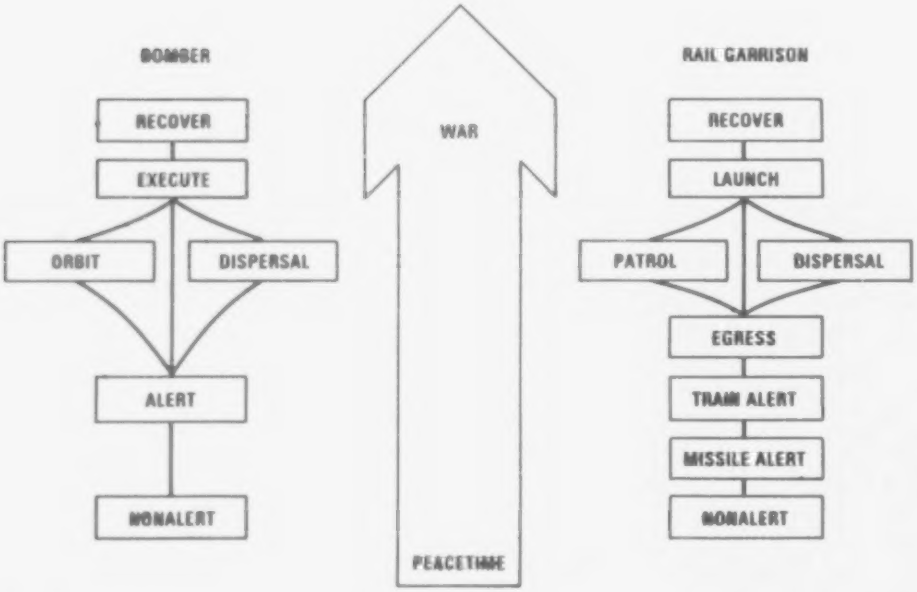
The missiles will be capable of launching in the same timing framework as applied to silo-based systems, within [deleted].

"Garrison egress," the term simply means, just like a bomber taking off or a sub leaving port, they go out onto the commercial rail network.

"Dispersal and patrol" are the two options and, as we will show on a subsequent slide, those are exactly the same options that we have with bombers. We can disperse our bombers to government-owned or civilian airports. We can disperse our trains to government-owned sidings or civilian-owned facilities, depending on what kind of war plan is appropriate in the 21st century or whenever these systems come into the inventory.

"Patrol" is comparable to flying airborne alert in the bomber mission.

OPERATIONS MISSION MODEL


BOMBER
RECOVER
EXECUTE
ORBIT
DISPERSAL
ALERT
NONALERT
WAR
PEACETIME
RAIL GARRISON
RECOVER
LAUNCH
PATROL
DISPERSAL
EGRESS
TRAIN ALERT
MISSILE ALERT
NONALERT

I think this slide pretty well captures the points that I was trying to make. We are showing here in the bomber case. Of course, we have bombers, [deleted] of our bombers on a day-to-day basis, that are not on alert. We will have trains in that configuration, in maintenance and so forth.

But generally speaking, unlike the bomber force, we will be able to keep all of our missiles on alert day in and day out, and that is our plan.

As far as bombers are concerned, we can generate and bring additional bombers on alert. As far as the missiles are concerned, when we go to train alert we are not talking about putting more warheads on alert; we are talking about bringing the crews in to man the trains.

The missiles continue to hold targets at risk in the Soviet Union. So when you bring additional crews in to man the train, you do not increase the threat to the Soviets. When you bring additional crews in and bring more bombers up, when you generate the bombers, you put more weapons on targets in the Soviet Union on a day-to-day basis.

So in terms of stability, when you egress in time of national need, the first point that we like to make as far as the Soviet planner is concerned, you do not threaten him in any additional way compared to the threat that you pose when you are in garrison.

What it causes for him is additional difficulty in determining your location. When he cannot find you, he cannot attack you, and that increases deterrence.

[Deleted.]

It costs people and money to do that, but that is the plan that the Strategic Air Command has today and exercises each year in Global Shield.

The same thing is true here. We can disperse, as we will show you on another slide, to a government-owned location, for example, or we can go on patrol. And if we were to exercise in this fashion in peacetime under Global Shield, we would not take the nuclear missiles with us. We would leave the missiles and warheads, just like we do with bombs, SRAM and cruise missiles during Global Shield.

We do not take our warheads with us. We leave the warheads in the weapons storage area. We would either do that or we would keep the missiles on alert in garrison with an additional crew.

And then of course, if you got into a war situation you have exactly the same kind of scenario with both weapons systems.

The basic point, sir, is that Rail Garrison is very comparable to bombers. We have been operating bombers in this fashion for 25 years, and we are very confident we can operate the trains in the same way. I might also point out that we believe the only time we have decided to disperse bombers was during the Cuban missile crisis.

We do not expect that there would be occasions to disperse trains unless we expect to have a similar crisis with the Soviets in years to come. Otherwise, these trains would stay in garrison.

[Chart deleted.]

To go on with the ops concept, just to go on to a little more detail, remember we talked about train alert, which means that we have crews on those trains. The missiles are always on alert, but we have crews now, and the [deleted].

This message directs dispersal. There could be a similar message or a paragraph in the message that could direct dispersal of the bombers. That capability exists today.

But we do not see any major difference in choosing to disperse bombers or trains in terms of the command and control procedures involved. However, we think it might be more stabilizing to disperse trains in time of national need than it would be to disperse bombers.

Other options would be disperse trains from selected garrisons, or you could disperse all trains. [Deleted.]

[Deleted.] So dispersal is directed and these are the actions that are required, just like the bomber.

When I was a bomb wing commander, every time we launched an airplane we had to contact the appropriate air traffic control facility in order to launch. We had a flight plan and, if it was an exercise, we activated our exercise flight plan.

We anticipate the same kind of relationship with the Nation's railroad control facilities. Each one of these dispatch centers controls 100, 200 miles of track, and so we would contact our local Kansas City dispatcher—we are doing an example out of Whiteman Air Force Base as an illustration—request movement and route.

He would give us clearance or he would not. When he was able to give us clearance, he would let us go, just like air traffic control does for an airplane. We would do whatever security procedures were required and we would implement the dispersal tactic.

What would it look like? I will show you a map quickly.

[Chart deleted.]

This is Whiteman Air Force Base here at Warrensburg, MO. And we have selected an option where we would take this route and go up to [deleted].

Now, a question that comes up, why did you choose this particular facility? Well, first, of all, it is just an illustration.

[Deleted.]

Now, the point to make is, how does the Soviet know that we have moved to [deleted]. You know, there are various hypotheses that you can come up with, but we can counter each one of these if we choose to do so. And the point we would like to make is there is tremendous flexibility available to the National Command Authority, the JCS, and the SAC planning staff to deal with the threat that exists at that time.

That is the same kind of flexibility we have in bombers and ships today, and we think we ought to have it in the land-based missile force.

The important point is that the Soviet planner does not know what we are going to do or, if he finds out what we did, it is going to take time to get back to him, time for him to do something about it. And by the time he makes a decision, we have moved on to some other place. He no longer can hold at risk the coordinates, like you can with silos.

[Chart deleted.]

Another option, dispersal has already been directed, and so the other option comparable to airborne alert for bombers is to direct patrol. And the same kind of choices are available to the National Command Authority, the JCS, and SAC planning staff.

He directs patrol, all garrisons, all trains, [deleted]. These are the actions. We have today SAC tactical doctrine that all of our bomber crews use in order to ingress and egress to a target in the Soviet Union.

The same thing would apply here. Now, we are still working on the SAC tactical doctrine, but frankly the SAC tac doctrine for bombers evolves as we speak, too. It is something you continually work at to try and deal with the enemy defenses.

We have to request movement authority, move, and we are going to stop, and we will talk about stopping and moving again on a subsequent slide.

[Chart deleted.]

These are some of the tactics that are available to us, sir, and I will go through each one of these with you. The point I am trying to make on the slide once again is the tremendous flexibility that is available to the National Command Authority and his military staff.

If this kind of flexibility is available to us, it creates in our judgment a practically insolvable problem for the Soviet planner. [Deleted.]

And General Doyle I am sure will talk about some of those planning factors later on.

A tremendous number of options that are available, and these options over here talk about the railroad side of it. We can blend them with other traffic. We can go as a specific train, [deleted] with a sanitized segment of track. They can say, look, you can move between milepost 10 and milepost 80, that is your clearance.

Or they can give us a moving block and say, OK, we clear you from point A to point B, 300 miles, and as long as you go at the posted speeds you can move that 300 miles, exactly the same way that the air traffic control clears an airplane to move across country.

We are very familiar with how we do that and our contacts, our very detailed contacts, with the railroad industry, with the Burlington Northern and the Union Pacific essentially, two of the major carriers as you know, and also with the Federal Railroad Administration and the American Association of Railroads, tells us that they do not foresee any problems in us operating on the rails.

[Chart deleted.]

This is an example of a patrol area and, quite frankly, one of the executives at the Union Pacific suggested this to us. This happens to be Union Pacific track.

We get clearance out of our dispersal area at [deleted]. That clearance is to proceed out to [deleted] and we are cleared to operate anyplace in this area for a specified period of time—24 hours, 36 hours, whatever the dispatcher wants to give us. So we will operate in there.

Where will we be in there? Well, that is up to the train commander. In other words, as long as he can hold at risk the targets that he is assigned, he can operate anyplace in this particular area, causing very difficult planning problems for the Soviets.

And you can see that in this particular area there are numerous ways to route other traffic around that may be going east or west in the United States. This is the patrol concept recommended to us by a railroad official.

[Chart deleted.]

In summary, if we had four trains at Whiteman and we wanted to put all four trains out in a patrol situation, these are the areas that we might be using. And you can see that the Soviet planner has to consider an enormous area in terms of a barrage attack or some other way of holding these trains at risk.

We think that is a difficult problem and contributes significantly to deterrence overall and stability in a crisis situation.

[Chart deleted.]

Another point to make, sir, is that only a few trains, as we conceive it right now, would be moving at any given time. There is no reason to have them all moving, and so what we would plan on doing is having a small percentage, reflecting here only 4 of the 25 trains that we had out, assuming seven notional bases—no relationship between these bases and our selection process at this point in time.

But we would only have four moving. The rest of them would be sitting in dispersal areas or sitting on a siding in a patrol area or what have you. And this gives us great confidence in the accuracy, [deleted] of these that are stopped.

And these particular trains would have to come to a stop and wait a short period of time before they could reestablish that kind of accuracy.

Small ICBM and Hard Mobile Launcher

Small, single warhead, hard target capable ICBM

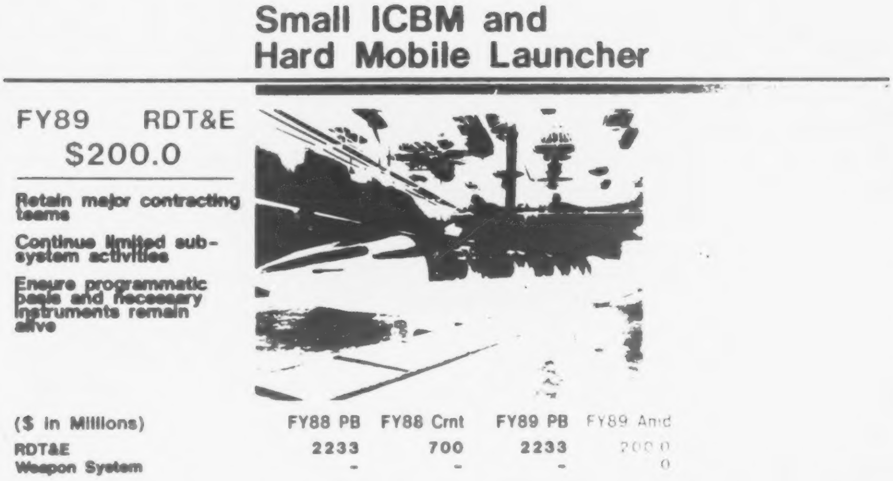
Flexible basing (hard mobile launchers on Minuteman launch facilities and random movement basing)

Survivable basing for long term stability; complements Peacekeeper and Minuteman

Program terminated. Funding provided to maintain option thru FY 89

Schedule

Concept definition phase	Nov 83
Pre-FSD phase	Jan 85
FSD	Dec 86
IOC	INDEF



Small ICBM and Hard Mobile Launcher

FY89 RDT&E
$200.0

Retain major contracting teams

Continue limited sub-system activities

Ensure programmatic basis and necessary instruments remain alive

($ in Millions)	FY88 PB	FY88 Crnt	FY89 PB	FY89 Amd
RDT&E	2233	700	2233	200.0
Weapon System	-	-	-	0

The small missile, sir. This is the program directed by the Secretary of Defense. These are the numbers. This is what we asked for in 1988, but we were only appropriated, authorized and appropriated, $700 million. This $700 million caused an 18-month slip in the IOC based on the 1989 President's budget that we were working with at the time.

The 1989 President's budget assumed $2.2 billion in fiscal year 1989. That was the budget submission under the 2-year rule last year. But the $700 million mark caused an 18-month slip in the program.

Of course, as you know, the President's budget that is currently over here has been amended so that there is only $200 million to keep the major contracts alive in the current program.

Senator COHEN. When you say alive, what do you mean?

General MAY. Sir, we are going to talk about it in the next slide.

Senator EXON. Be careful of those words you use. That causes great consternation in some quarters.

General MAY. Yes, sir.

These are the planning factors that we have used. I think my slides were out of sequence here. We will just go on to the next slide.

REBASELINE GROUND RULES

- **DEFER THE FOLLOWING EFFORTS UNTIL FY 90 OR BEYOND**
  - **—LOGISTICS (SUPPORTABILITY)**
  - **—PRODUCIBILITY**
  - **—ENVIRONMENTAL AND SITING ANALYSIS FOR OPERATIONAL DEPLOYMENT**
  - **—OPERATIONAL TEST PLANNING AND HARDWARE DEVELOPMENT**
  - **—DEPLOYMENT PLANNING AND DEVELOPMENT (ASSEMBLY AND CHECKOUT)**
- **MISSILE**
  - **—BUILD FTM-1, -2, AND SPARES; FLY WHEN READY**
  - **—CONTINUE AT LOW LEVEL THEREAFTER—CONCENTRATE ON IMPROVING ICBM TECHNICAL BASE FOR THE FUTURE**
- **BASING**
  - **—BUILD ONE HARD MOBILE LAUNCHER TEST UNIT; CONTINUE NORTHERN TIER MOBILITY TESTS**
  - **—CONTINUE WEAPON CONTROL SYSTEM REQUIREMENTS ANALYSIS**
- **DEFER GOVERNMENT AGENCY SUPPORT EXCEPT IF REQUIRED FOR ABOVE ACTIVITIES**

These are the ground rules that were established to run the $900 million program, $700 million in fiscal year 1989 and $200 million for planning purposes—$700 million in 1988 and $200 million in fiscal year 1989.

These are the ground rules and assumptions, and this is basically a contracting assumption. The second assumption is that we plan to launch when we are ready. For planning purposes, this allows additional funds to be spent by the Ballistic Missile Office, assuming that special termination liability is covered by the Secretary of the Air Force, which we anticipate will happen.

The ultimate inertial navigation system competition was completed in January. The AIRS system was selected, and so this program does not continue. We need to have direction by April 1 and it would require approximately 18 months to power up again to having the full team together in order to proceed with the full-scale development program, assuming a decision in fiscal year 1989.

The effort. These are the four major components of the effort: prepare for flight test, and the first flight test would be available to us in the first quarter of calendar year 1989, the second flight test available one quarter later, and we have procured the assets required to do that. We will continue to concentrate on the missile itself because that is the long pole in the tent in terms of developing a full system.

First and foremost, we have to develop the missile, and that is one of the major distinctions between the small missile program and Peacekeeper-Rail Garrison, in that the missile is already developed and available and tested in the Rail Garrison program. That certainly is not true in the Small missile program.

So when you try and compare timing lines, it is very difficult, because we have a Government furnished equipment [GFE] missile available to us in Rail Garrison.

The launch control development. We have the requirement not only in Rail Garrison for launch control capability, but also we need to consider changing out the launch control capability in our Minuteman silos, and so this is a common effort that will support all three programs.

And finally, we de-scope the basing effort, but we have maintained open contracts. We are ready through FTM-2, we are ready to launch two missiles if that decision is made, and we will terminate the subcontractors and vendors at a logical point. And the fundamental concept of a logical point is that point when the vendors no longer are required to supply piece parts, because that is what the vendors are doing right now.

In full-scale development, what we are doing is procuring missile systems and test units for the basing option. We are procuring those, assembling them, and testing them.

Now, once you stop procuring the first two missiles and spares to go along with it, then you don't have any use for the subcontractor who was building a widget that went on your first stage. And so that is the concept that defines the logical point.

Sir, that is the level of detail that I would go into initially. If you have any additional questions, there are some other slides that we can show that would go into greater detail.

MOBILITY, DECEPTION AND CONCEALMENT

Senator EXON. General, let us go to a 5-minute question round now. We may have to flash back to some of your slides up there, and then after we each have 5 minutes we will continue with the next witness, and reserve the right to come back to some of these things.

So let me start out. Have you thought, for diversionary purposes and to keep the Soviets confused, that when these trains are out, either under an alert status or a non-alert status, whether they should carry nuclear weapons or not? Have you thought about having parking garages or a covered facility of some kind, which is another way of harkening back to the original concept of the MX?

I am not thinking of a blast-protected shelter. I am just thinking of a long tunnel that might hold a train, but which would preclude the Soviets knowing whether or not an MX train was in it. Is that one of the things, the options you are studying?

General MAY. Sir, the direction, as you recall, in the fiscal year 1986 authorization bill was to look at mobility, deception, and concealment. And we certainly are investigating those possibilities.

We clearly could use existing facilities. I think there are thousands of existing facilities, in which there are railroad tracks. And so we could move into those facilities, assuming we work out agreements with the current owner, inhabitant, and so forth.

And we clearly could do the kinds of things that you suggest, with the caveat right now, as we look at the potential verification rules under START, some of these things may or may not be available to us. But for planning purposes today, we are looking at all those options, [deleted].

Senator EXON. Well, you are not emphasizing the "bolt out of the blue" theory as greatly any more, and that is why I was interested in your [deleted] or so dispersal time. Let us suppose, though, that we would not have the 2- or 3-day notice that we think we might have.

Let us suppose that we suddenly saw some activity that got people very concerned about maybe a surprise attack was likely within 4 hours. It takes you [deleted] to get that train to leave the base or wherever it is. I assume these trains that are on base will be fully loaded and ready. All you have to do is get the crews on there and get the engine started and take it out.

From a reasonable standpoint, how far would you like to be away from base from the standpoint of impacted areas? I mean, 20 miles, 200 miles, 400 miles? Have you got any ideal spacing system that would be ideal for survival?

General MAY. Sir, the basic idea of the train is to react to the warning situation, and we do not envision building into the system the kind of hardness that we plan to build into the small missile.

In other words, the small missile with its [deleted] and the design of the missile carrier itself was able to have a high probability of surviving [deleted]. The train is not designed to survive in that kind of a situation.

The basic principle of survival is to generate area over time, and our calculations tell us that if we had all of our trains on train alert, which means that we have the crews there and so forth, and we could get out of garrison—you know, it takes [deleted] to start the train and get out of garrison—we could flush the garrison very quickly.

[Deleted.]

Senator EXON. Which is another way of saying that by dispersing in this fashion we would really compound and confound the Soviets' planning?

General MAY. Absolutely, sir.

RAIL TRAFFIC CONTROL

Senator EXON. My last question has to do with the movement of this on a rather rapid basis. If we have the time allotment that you say, we are talking 2 or 3 days, then I think we can work things out.

I saw a rather interesting demonstration the other day. I do not know if you have ever seen it or not, General, by a computer company that has developed the software that is now used for the Union Pacific tracks in certain places in western Nebraska. It is designed basically for overall rail traffic control, where there will be a computer right in the cab where the engineer is hooked up to the main dispatcher. Via radio directions, and they can automatically stop that train within 5 feet of a certain point.

They can divert that train onto a siding track up ahead. And we got into the MX possibilities, and they are doing some work on that also. They have been out to SAC, I believe. I do not know whether you have talked to them or not.

Do you know the mechanism I am talking about?

General MAY. I am familiar with the concept, sir. I have not had the opportunity to view it first-hand.

Senator EXON. It just seems to me that, although this would be a considerable investment, you know, you literally could push a button and could clear that track for 500 miles, if you wanted to, within a matter of 10 to 15 minutes.

Every train at any place would have a place to go to get out of the way. And I thought that was a concept that was worth looking at, and I wanted to mention it to you.

My time is up. Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman.

VERIFICATION UNDER START

You passed over rather quickly the verification requirements under START. I would assume that you have not been given much direction in terms of trying to structure a program taking into account what START may or may not entail, is that correct?

General MAY. Sir, the deliberations are ongoing on the START rules.

Senator COHEN. I understand, but you have really little direction coming from the administration saying what factors you should take into account? Our negotiating position, for example, is that we ban all mobiles. That seems highly unlikely to be the result.

Another option would be, does it ban land-based mobile MIRVed systems, which frankly is one position I have advocated, which may or may not be likely. But you do not take that into account?

You are just planning what would be necessary in the event that you had no restraints under START or any other agreement?

General MAY. [Deleted.]

SMALL ICBM

Senator COHEN. Let me come back to the Small ICBM. My understanding is that you have been directed by OSD to take into account the lack of funding for this project and scale it back substantially. Is that right?

General MAY. Yes, sir.

Senator COHEN. You will present a proposal to the DAB what, March 31?

General MAY. There is no requirement to brief on the small missile, no, sir.

Senator COHEN. What do you suppose you will recommend? My understanding is you will recommend a cutback of some two-thirds on the major contractors, 90 percent of those second tier vendors that you recommended on the chart.

General MAY. Sir, the basic position is that the Ballistic Missile Office met with the contractors on March 3, and they basically went through the program that I showed on the last slide, and they told the contractors that this is what they plan to do during the next 18 months, and gave the contractors essentially 2 weeks to come back and tell them whether or not they can do that and what the impact would be and so forth.

And they are at the present time gathering that information, and prior to April 1 they will report to Mr. Welch and tell us what their judgments are as to how best to spend the remaining money on the small missile program.

Senator COHEN. Mr. Welch, am I wrong that that will result in all probability, in order to save the option for a future President, you have got to have at least a two-thirds reduction in the major defense contractors on the small missile, about a 90-percent reduction in the second tier vendors?

JOHN WELCH, ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION

Mr. WELCH. The present plan, if we get the responses back from the contractors the way we understand, would cause that to happen, but, in fact would maintain the option.

IOC OF SMALL MISSILE

Senator COHEN. If that option were actually to be available to a future President, who will be picked about 5 weeks after the fiscal year begins, next fiscal year begins, what would be the IOC of the small missile? Let us assume a future President wants to reignite the ICBM, Small ICBM.

What is the projected IOC?

Mr. WELCH. I think you have to take a look at everything from the level of funding to the program you lay down or whatever. But you are certainly looking at something—General May showed last year we lost 18 months right off the bat, and I think we would be looking at something of the order of another 18.

Senator COHEN. We have already got anywhere from an 18- to 24-month delay built in as a result of past funding profiles. So you add another 18 months on top of that, it works out to about, Mr. Chairman, I think 1996 would be the likelihood of the IOC on a small missile of that type.

Mr. WELCH. I think it would be very difficult to say. I think if you take perhaps the 3 year kind of delta time period and look at the funding from that, then you can come to your own conclusions as to what maximum rate of funding you could apply. But 36 months is certainly reasonable.

Senator COHEN. Well, even with the maximum rate of funding, you have got to hire back all of the contractors, you have got to get your vendors back on line.

General MAY. Senator Cohen, I might mention one thing, that in the normal course of events in fiscal year 1989, if we had had full funding we would have been laying off subcontractors, because they would have finished producing their widgets for the 22 first states that we were buying and so forth.

And when we made a production decision, we would have to go back and bring those people back into the fold. So that is kind of the normal way that you transition from FSD to the development process.

Senator COHEN. That is all I have.

Senator EXON. Thank you, Senator.

Senator Glenn.

Senator GLENN. Thank you.

MX VERSUS SMALL ICBM

I agree with everything he said on the advantages of mobility. Where we come apart is MX versus the Small ICBM. I agree, if you cannot find them you cannot attack, and that increases deterrence.

And yet, everything you say about deploying this missile applies 10 times over to the Small ICBM, and I never have understood to this day the Air Force's reluctance to really get into that program. It was only after some of us here really pushed that issue hard a few years back that we established the office out there at Norton and really went at it.

And there has been a foot-dragging operation ever since. I do not see why, if some mobility has all the advantages you say it does—and I agree with that completely—that more mobility does not do you even greater.

Why do we hunker down on [deleted] square miles and say, we will get [deleted] with all of the complexity and weight and reduction of mobility that that causes? And then we say we do not need trains because we are going to greater territory, which is what some of us have advocated all along for the Small ICBM.

I think they should be deployed everywhere. The Soviets could not possibly know where they are. And it has got to be far easier to cut a railroad track than it is to know where all the roads are that will hold a 250,000 pound vehicle after we got this turtle mentality out of the way.

So where are we going with this route? I just—the concept, the public interface, that is the one you used to tell us in the Townes Commission days. That was what was against the idea of a Small ICBM, public interface would never accept it.

How are you going to sell trains up and down the railroads, going through towns and so on with missiles on them? That has been the public interface problem all along.

If we can accept it on railroads, by and large which go right through the middle of towns—you do not even go around the circumferential highways, for instance, that we have now. Yet we still cannot sell this idea that more mobility is better.

And it is greater deterrence, I agree with you, General, 100 percent. Why do we stick with the MX and say it does not need protection, but when we get to the Small ICBM we complicate the blooming thing with all sorts of vehicles and development?

I just do not understand it, because more mobility to me is better. And the Soviets are doing it right. You know what the road-mobile does when it is tossed into a war game in this country. When we try and find a Soviet road-mobile, it confounds the whole problems.

It is deterrence to the nth degree, and yet we are not going that route. We are cutting back, and everybody seems to pull back on it. I do not understand it.

Anybody?

Mr. WELCH. I will give you the—the up-front comment, Senator Glenn, is that you are correct that mobility is the thing that is being featured here. But you have to have mobility also within a budget.

Senator GLENN. But you have overcomplicated this issue to the point where it has budgeted itself right out of existence. You could have gone the king-size Safeway truck route, made this thing really road-mobile, and we would have been in business a long time ago.

Instead, we have spent about 3 years developing a turtle out there.

Mr. WELCH. I think if you look at the out years that the Air Force is faced with right now something on the order of about $100 billion in shortfall. This program alone, the small missile, is one-third of that shortfall.

Senator GLENN. Did we run any figures out on the cost effectiveness, based on the cost to build and deploy, and compare it with the cost to deploy a survivable warhead by dispersal?

That is what you are after, is a survivable warhead. You do not get that hunkering down and building armor over it. You get it by getting out and using whatever the 27 million square miles it is that we have in the country that is available.

And you talk about a train track and you have a very prescribed racetrack pattern. That is great. In the same area, you would have 500 roads and crossroads and Federal roads that would take a small missile.

General MAY. Sir, certainly if we had the capability to operate at will with the Safeway truck example that you use on the Nation's highway system, it would complicate even further the Soviet planner's problem of holding at risk all our force structure.

I think our judgment today is that when we look at cost, we look at schedule, we look at risk, and we look at performance in today's budget environment, we say that we deal with a significant portion of the spectrum of conflict with rail garrison, and it costs us one-quarter to get essentially the same performance as the Small missile program.

And I might point out that the cost is approximately two-thirds to 70 percent applied to the missile. In other words, the major cost in the small missile program of $35 to $40 billion is the cost to develop and procure 500 missiles.

The least costly item is the basing option. It would, of course, be even less costly if we had the Safeway truck. But still, the missile drives the cost.

Senator GLENN. I am just interested in survivable warheads, and I think you get far better survivability the more dispersion capability you have. And we have deliberately not gone in that direction and started this MX development.

And I think it is the wrong direction.

Did I understand you to say that you go to full-scale development this spring for Rail-Garrison MX?

General MAY. Yes, sir. And the program will be comparable to the small missile, which is already in full-scale development.

Senator GLENN. Has the development work been done that will support a decision to move to full-scale development now?

General MAY. Yes, sir, we believe so.

Senator GLENN. Not just the missile, but the train and the carriage and the whole works?

General MAY. Yes, sir.

Senator GLENN. My time is up.

Senator EXON. Thank you, Senator Glenn.

Senator Levin.

RAIL-GARRISON MX SURVIVABILITY

Senator LEVIN. Thank you, Mr. Chairman.

Is the Rail-Garrison MX survivable against the "bolt out of the blue" attack?

General MAY. Sir, if the missile were still in its garrison at that point in time, it would more than likely be destroyed, assuming the Soviet weapon that was targeted on it arrived.

The same thing is true of the Small missile.

Senator LEVIN. Does that mean it is not more survivable than the Minuteman and is in fact less survivable than the Minuteman?

General MAY. It means that the price to attack that the Soviet planner, using the alert force that he has, attacking missiles in silo or garrison, is essentially the same.

Senator LEVIN. Is the answer to the question that it is not survivable against the "bolt out of the blue" attack? Is that the short answer to the question?

General MAY. Assuming the missile is there, yes, sir.

Senator LEVIN. Assuming we have not launched on warning?

General MAY. Assuming we have not launched under various circumstances. But of course, from the Soviet planner's point of view he cannot assume that. And from the Soviet planner's point of view, he has got [deleted] of the bombers to contend with, [deleted] of the sub missiles.

And he has to make a judgment on whether or not the National Command Authority decided to use the missile force prior to the time they were destroyed. That is the triad that deters a "bolt out of the blue" using alert forces today.

Senator LEVIN. That is true now, is it not?

General MAY. Yes, sir.

Senator LEVIN. So that does not change the current situation?

General MAY. It does not change the current situation, that is exactly right.

Senator LEVIN. Is the Rail-Garrison MX more or less survivable than the current Minuteman in silo?

General MAY. In that same circumstance, it would take probably [deleted] to have confidence on the part of the Soviet planner that he destroyed that weapon, and we calculate it would take [deleted] on the part of the Soviet planner to have confidence in destroying a missile in the silo.

Senator LEVIN. Are you saying they are equally survivable?

General MAY. In my judgment, the Soviet planner would have to use [deleted] on both.

Senator LEVIN. We could have just as readily put our Minuteman above ground in terms of survivability as putting it in a silo?

General MAY. In terms of it requiring [deleted] yes, sir.

Senator LEVIN. Well, is that not key to survivability?

General MAY. No, sir. We think the key is price to attack. We think complicating the Soviet planner's decision process is the key.

Senator LEVIN. I understand that. I was talking about survivability. Purely in terms of survivability, is not a Minuteman then in the silo no more survivable than a Minuteman on the ground by your definition of survivability?

General MAY. In a pure exchange model, that is true.

Senator LEVIN. Now, are you suggesting and proposing that it is more likely that we would be attacked after our forces are generated than we would be to have an attack out of the blue?

Is that the assumption behind that?

General MAY. [Deleted.]

Senator LEVIN. Is it a rational decision to attack us after our forces have generated?

General MAY. Sir, I think it makes the problem from the Soviet planner's point of view so much more difficult that it would be unlikely that he would attack, even more unlikely than that he would attack from day to day alert.

Senator LEVIN. So an attack after our forces have generated is even more irrational than an attack out of the blue?

General MAY. Sir, I think the problem the Soviet planner faces is that he not only contends with the missile force, but under a generated scenario we put more weapons on alert.

And I do not believe you were here when I was explaining that the missiles in Rail Garrison are on alert 24 hours a day. Putting those trains out on the rail does not increase the threat to the Soviet planner.

But when we generate the bombers, we put more weapons on alert. As you know, [deleted].

Senator LEVIN. I am trying to understand what you are saying about the level of irrationality. Did I understand you correctly that in your view an attack against us after our forces are generated would be at least equally as irrational and perhaps more irrational than an attack against us out of the blue before our forces are generated?

General MAY. Sir, the Soviet planner would face a much greater challenge in trying to destroy our forces in a generated scenario than he would face in a day-to-day alert scenario. And in my judgment, the probability of him making that decision would be less in a generated case than in a day-to-day alert case.

Senator LEVIN. Thanks.

My time is up.

Senator EXON. Thank you.

Senator, I think some of the questions you have asked are likely to be handled in the next area. The reason we limited it to one round is that I would like to go to General Doyle now. I wanted to explain to the members of the committee that General Doyle gave us an excellent briefing last year that not many of the members had a chance to see.

I would like to have you proceed.

FUNDS SPENT ON SMALL MISSILE

Senator **Cohen**. Mr. Chairman, may I ask one more question? How much has been spent of the $700 million for fiscal year 1988? How much of that has been expended on the Small missile system?

General **May**. Sir, there are two operative considerations. One is the obligation rate and the second is the expenditure rate.

The obligation rate, based on the $700 million mark last year and the renegotiation of the contracts, is approximately $592 million. However, the expenditure rate at this point in time is somewhere around $250 million against that obligation of $592 million.

Senator **Cohen**. Just so you will know, if you do not know, the chairman should know that Congressman Aspin has sent a letter to Secretary Carlucci asking him to preserve to full strength the contractor base for the Small missile and to expend the money, the $700 million, to do that this year, rather than holding out the money and letting the contractors go.

Senator **Exon**. Thank you, Senator.

Senator **Levin**. Mr. Chairman, could I have just one similar question?

I will save it.

Senator **Exon**. Can we not hold it?

General, let us go to you now.

Senator **Levin**. What is the minimum amount that we need in the budget to keep the MX Rail Garrison option open for the next President?

Senator **Exon**. MX Rail Garrison? They have got that fully in.

Senator **Levin**. What is the minimum?

General **May**. I do not have the answer to that, sir.

Senator **Levin**. Would you work that up for us?

[The information follows:]

MX RAIL GARRISON FUNDING

If we are to keep a credible Rail Garrison program for the next President, we should have at least $650 million in fiscal year 1989.

Senator **Exon**. General, we have additional questions which we wish for you to answer for the hearing record.

[Questions for the record with answers supplied follow:]

Questions Submitted by Senator J. James Exon

REVISED COST ESTIMATES FOR THE RGMX

Senator **Exon**. Have the cost estimates for the Rail Garrison basing mode been revised since last year?

General **May**. Yes sir. The latest Program Office cost estimate has decreased from $9.1B (TY$) to $7.4B (TY$). Neither cost includes the second 50 deployment missiles.

PENAIDS

Senator **Exon**. We have been deluged lately with reports of Soviet ABM upgrades and treaty breakout potential. At the same time, the administration terminates the PENAIDS program on the eve of full-scale engineering development. We understand that a modified design was approved by the Scientific Advisory Board and could have been incorporated into the FSED program without significant risk to cost or schedule. If that is true, what justification do you have for terminating the program, and what are you doing to compensate?

General **May**. It is true that an evolutionary decoy design grew out of advanced development work for the Minuteman III Penetration Aids Program. The new-design decoy would have incorporated some active electronic simulation features in combination with the original passive design. However, budgetary constraints and other higher priority defense needs forced cancellation for the Minuteman III Penetration Aids Program. We intend to compensate by [deleted]. In addition we will use the remaining fiscal year 1988 funds to complete part of the advanced development on the decoy and chaff so that full-scale development could be initiated if the threat further increases and funds become available.

SICBM TEST

Senator EXON. Am I correct in assuming that you will still be flight testing two Small ICBMs with next year's money? I understand that that will only cost you a few tens of millions. Is that right?

General MAY. The restructured Small ICBM program will continue with flight test planning proceeding toward two test flights. Each test flight is estimated to cost around $25 million per test for hardware, software, range support etc.

SMALL ICBM

Senator EXON. The House Armed Services Committee staff report on ICBM modernization, referring to the Rail-Garrison MX program, asserts that "a system that requires strategic warning to survive solves a problem that the United States does not have." The authors point out that in the event of strategic warning we have other ways of generating survivable warheads. What the staff report seems to miss is the fact that we can gain additional survivable warheads with our day-to-day posture by the same methods—i.e., generating more alert bombers and at-sea submarines, both of which are far cheaper than the Small ICBM. Do you have any comments on these arguments:

General MAY. The House report you reference missed the mark regarding the full capabilities of the Rail-Garrision Peacekeeper program. Rail-Garrison will be an extremely versatile system combining the best attributes of our land-based ICBM's with increased endurance and mobility. The report suggests that Rail Garrison must rely solely on strategic warning to effectively perform its mission and contribute to our deterrent posture. In reality, the system will provide many high-quality warheads, at an affordable cost throughout the entire spectrum of deterrence, which will be available for immediate response in both day-to-day and generated alert conditions.

MIRVING SMALL ICBM

Senator EXON. The HASC staff report also suggests reexamining the idea of MIRVing the Small ICBM. If my memory serves, it was the HASC that vehemently opposed such a concept when DOD first raised it—and vehemently may be too soft an adverb. What was the HASC's reaction to the MIRV proposal? Is it appropriate to consider MIRVing a missile after it has entered FSED? Does that sound like a "model development" proposal to you?

General MAY. The HASC report "Midgetman: Sliding Shut the Window of Vulnerability" 10 February 1986, did not vehemently oppose the concept of a two RV MIRVed 37,000 lb Small ICBM. The HASC addressed a 45,000 to 49,000 lb missile alternative when they mentioned a 2 RV MIRV and even then Congressman Aspin stated "There's little question that we could lower the per-warhead cost of the Midgetman by plunking more warheads on each one." Congressman Aspin went on to say, "But it's not clear that we would gain anything. If we put on more warheads, we must have a much bigger missile. And if we have a much bigger missile, the special trucks carrying it will be clumsier and slower and more difficult to disperse in a crisis. With the trucks dispersed over a smaller area, the Soviets would more confidently attack them with fewer warheads. The bottom line is that a multiple-warhead Midgetman would save money—but at the price of less deterrence and less stability, which is hardly what we are aiming for." Congressman Aspin went on to say, "These problems emerge on the margin if you go to two warheads."

The Small ICBM entered FSED in December 1986 in concert with the "Report of the Defense Science Board Task Force on Small Intercontinental Ballistic Missile Modernization" recommendations that stated "The Task Force strongly recommends that the weight limit for the SICBM be increased from 30,000 lb, to 37,000 lb. This increase will permit the missile to carry a modest penetration aid package to counter possible future Soviet ABM defenses without sacrificing target coverage. The Task Force believes that this extra weight will provide payload flexibility in the future to deal with unforeseen threats without significantly sacrificing the flexibility in missile basing options that follow from the SICBM's small size (Minuteman missile weight is 78,000 lb and MX missile weight 196,000 lb). This 37,000 lb design weight can be accommodated by increasing the length of the missile, a step which will not necessitate major redesign or a delay in the current schedule. This additional payload weight should also provide for alternative warhead configurations, including the possibility of maneuvering re-entry vehicles (MaRVs) and some types of earth penetrator weapons. The overall missile design should provide for these later possibilities even though such re-entry vehicles are in the early stages of research. The additional weight also enhances the possibility of the SICBM carrying two warheads per missile, smaller than the MK-21, should future circumstances warrant. At this approximate weight we do not believe that the inherent flexibility or movement and deployment described above for the SICBM/HML force would be compromised."

Since the Air Force has proceeded with the 37,000 lb missile design and protected the front end options for new developments since the start of FSD in December 1986, the missile could be MIRVed. The SICBM has been a model program since its inception, it is just too expensive in the current fiscal environment.

MX TRAIN LOCATIONS

Senator EXON. The HASC staff report points out that, if civilian railroad dispatchers know the location of MX trains, the Soviet Union could locate them by, quote, "compromising railroad employees." Granted this is true, do you think that our patriotic railroad employees are any more susceptible to subversion than any other civilian or military personnel to whom we entrust our Nation's vital secrets?

General MAY. Absolutely not! The rail industry has a long history of patriotic support. It wasn't very long ago that the President routinely traveled by rail and the security apparatus developed for that and shipments of sensitive material is in place and in operation. When the U.S. Congress went to Philadelphia to celebrate the Constitution's bicentennial, it went by train.

SMALL ICBM FUNDING

Senator EXON. Based on the plan for Small ICBM spending and work that you described, how much of the $700 million in fiscal year 1988 monies do you plan to carry forward into fiscal year 1989, to add to the requested $200M for fiscal year 1989?

General MAY. We do not plan to carry forward any fiscal year 1988 funds into fiscal year 1989. We have fully obligated the fiscal year 1988 funds released to us to-date ($590M) and plan to immediately obligate the remaining ($110M) upon release from OSD.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

MX RAIL GARRISON

Senator THURMOND. Mr. Aspin's press release on the Rail-Garrison basing mode asserts that "rail-basing schemes have been shelved twice in the past because of public opposition." My recollection is that past rail-based schemes involved peacetime movement of nuclear weapons on the rails. Is this the case, and in what other ways is the Rail-Garrison basing mode different from the past in terms of public interface?

General MAY. Past rail-basing schemes (one for Minuteman and one for Peacekeeper) did, in fact, involve day to day, year after year peacetime movement of nuclear weapons on the rails. In the Rail-Garrison basing mode, missiles mated with reentry systems would not be on the public rail network except in times of national need. The garrisons, located on existing military installations, will reduce public interface to a level no greater than that faced by the alert bomber force.

SMALL ICBM COSTS

Senator THURMOND. Mr. Aspin's report suggests that the cost of the Small ICBM could be reduced by reducing the number of missiles deployed, or by installing two warheads each. What would such changes in the program do to relieve the near term budget problem, which led to the current budget request for the Small ICBM?

General MAY. The near term budget problem is not created by the actual production decision. The production decision is where the bulk of dollars enter the program. Both MIRVing and reducing the number of missiles deployed would lower the cost of the program. However, the decision on Small ICBM was made with the entire budget in mind. It is simply not cost effective when compared with other strategic alternatives.

SMALL ICBM CONTRACT OPTION

Senator THURMOND. Have you examined a Small ICBM program option in which the contractor team was maintained through the early days of new administration, and what funding is required and when to protect such an option?

General MAY. Yes. The $200M protects the option for 1989. If termination occurred early some funds would be saved, however, the exact amount would have to be determined through contract negotiations with 18 contractors.

ADVANCED STRATEGIC MISSILE SYSTEMS

Senator THURMOND. Can you describe for the committee how the Advanced Strategic Missile Systems program will take up the slack of the canceled Minuteman PENAIDS program? In your judgment, does this approach provide adequate lead time in the event of a Soviet ABM breakout?

General MAY. The Advanced Strategic Missile Systems (ASMS) program is not adequately funded to compensate for the cancellation of the Minuteman III PENAIDS full-scale development (FSD) program. However, we will continue some advanced development of the passive decoy and chaff with a portion of the fiscal year 1988 Minuteman PENAIDS program funds so that we could rapidly progress to FSD should adequate funding be restored.

ASMS has a continuing effort to develop technologies to counter Soviet antiballistic missile system developments. We are developing technologies for an active electronic decoy and pyrotechnics to counter advanced radar and radar/optical discrimination systems. In addition, technology development for maneuvering reentry vehicles (MaRVs) and their associated replica PENAIDS in the Evader Replica (ERPA) project are directed at providing a high-confidence solution to the most stressing threat scenarios. These systems should be available for FSD by the mid-90s with a projected IOC prior to the year 2000 if a decision was made to go into FSD. All of these latter programs will be more capable in the long run. Any response to Soviet abrogation of the ABM Treaty will now be delayed because of the cancellation of the Minuteman III PENAIDS program but fiscal constraints have forced us to accept this risk.

SMALL ICBM ADVANCED GUIDANCE SYSTEM

Senator THURMOND. The Small ICBM Advanced Guidance work was canceled as part of a planned down-select. Does the Air Force intend to carry forward any work on advanced or alternative ICBM guidance systems for future applications?

General MAY. We did not cancel the Small ICBM Alternate Inertial Navigation System (AINS) being developed by General Electric. After the second AINS downselect, between the Litton ring laser gyro and the General Electric stellar inertial update systems, the program manager conducted an analysis between the General Electric system and the baseline Advanced Inertial Reference Sphere (AIRS) system for the operational guidance system. This analysis included life cycle costs, technical challenges, risk, and schedule and resulted in a program management decision, coordinated with myself and Mr. Welch, to select the AIRS system.

We plan to continue our work on advanced or alternative guidance systems emphasizing future or next generation technologies under the auspices of our Advanced Strategic Missile Systems (ASMS) program. The immediate plan is to evaluate future technologies, first at the instrument level (no systems work initially) and proceed in an orderly fashion toward the next generation guidance system for current and/or future ICBMs.

SMALL ICBM FLIGHT TEST

Senator THURMOND. Has the administration decided to flight test two Small ICBM development missiles in the next year, and what program or technical considerations are relevant to such flight testing?

General MAY. The program the DOD and Air Force agreed to assume that we will continue development of the missile components, continue flight test planning and missile processing, and conduct missile launches when the missile is ready (not earlier than current schedule, first quarter calendar year 1989). These flight tests are relevant not only for providing the new administration with a benchmark for making their decision on the Small ICBM program, but they are also relevant since some of these missile components (stage III, post boost vehicle/shroud, guidance and control integration) may be used/modified for possible modernization enhancements to the existing Minuteman forces in the post-START arena.

START AGREEMENT—BUDGET IMPACTS

Senator THURMOND. To what extent are program decisions reflected in the fiscal year 1989 budget influenced by the prospect for a START agreement limiting ballistic missile warheads.

General MAY. Program decisions reflected in the fiscal year 1989 budget are not influenced by the prospect of a START agreement. The AF portion of the fiscal year 1989 budget is based on the current 5-Year Defense Program. We recognize that modernization will be even more important in an arms control environment to hedge against cheating, unexpected new technologies, or defense breakout. Adjustments to our programs will be made when definitive information is available regarding the numbers and types of systems which will be allowed when the treaty is enacted.

STRATEGIC WARNING CAPABILITIES

Senator THURMOND. Last year, you provided an unclassified statement with respect to our level of confidence in strategic warning capabilities that proved very helpful in debate on ICBM modernization. Would you be kind enough to do that again this year for the record?

General DOYLE. My conclusions during last year's testimony was that I have extremely high confidence in the quality, credibility and timeliness of the DOD Indications and Warning (I&W) system. Our excellent record of highly accurate analysis of Soviet force activity levels—using broadly based indicators—demonstrates a strong capability to provide the National Command Authority with advanced indications and warning of a Soviet attack on North America.

[Whereupon, at 3:09 p.m., the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

FRIDAY, MARCH 25, 1988

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES
AND NUCLEAR DETERRENCE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

AIR FORCE REVISED SPACE LAUNCH PROGRAM AND POLICY

The subcommittee met in executive session at 2:24 p.m. in room SR-222, Russell Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon and Thurmond.

Staff present: Robert F. Bott, William E. Hoehn, Jr., Ronald P. Kelly, T. Kirk McConnell, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Milton D. Beach and Donald A. Mitchell, assistants to Senator Glenn; Terrence M. Lynch, assistant to Senator Shelby; James M. Bodner, assistant to Senator Cohen.

Also present: Richard Dal Bello, Office of Technology Assessment; and Peter Lennon, Senate Appropriations Committee staff.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. The subcommittee will please come to order.

The Chairman wants to apologize to the witnesses and those gathered for being late. I was on the floor and I got over as soon as I could, and I do apologize.

The subcommittee this afternoon will meet, for the ninth time I might add, in order to review the fiscal year 1989 defense budget request. Our hearing today is on the critically important space launch recovery program and the preliminary plan for the long term health and capacity of the United States' space access system.

We have two witnesses this afternoon appearing on separate panels. Our first witness is Hon. Edward C. Aldridge, Secretary of the Air Force. We welcome you, Mr. Secretary. We are always glad to have you in front of this committee, and it is a great pleasure to have you here with us today.

You may get some tough questions from us on this. But let me note here now that the Nation is indebted to your leadership for keeping our vital space system alive through these difficult times and for vigorously pressing the space launch recovery program.

The witness on the second panel is Mr. Dale D. Myers, the Deputy Administrator for NASA, and I welcome him now and congratulate him in turn for bringing the shuttle back to the verge of flying once again.

The focus of the hearing is on the Defense Department's space access program, both near term and far term. Last year the Department indicated that it could no longer hope to rely heavily on the space shuttle and assured Department of Defense space access must be achieved for quite some time at least with expendable launch vehicles.

The committee held one preliminary hearing last fall on the budgetary and policy implications of this decision.

Today we hope to lay the foundation for supporting a markup of the space launch request next month. The basic facts are that this committee is being asked to approve about $6 billion worth of space transportation enhancements over and above what was in last year's 5-year defense plan just to get us through to the mid-1990s.

This comes at a time of flat defense budgets overall and enormous pressure on the strategic forces account in particular. These facts speak for themselves and illustrate the gravity of the testimony that we will hear today and what effect that testimony will have on our decision. The committee must be satisfied that this program is thoroughly justified.

The far term situation is on less challenging and deserving of careful scrutiny. In addition to the near term booster diversification, increased booster procurement, and enlarged booster production capacity, the committee is being asked to support a whole new "family of boosters" under the advanced launch system program, as well as the large expenditures for the national aerospace plane.

The advanced launch system technology program in the midterm also is supposed to provide a product improvement to the existing fleet of boosters and perhaps yet another, heavy booster for the Strategic Defense Initiative.

We have asked NASA to testify today because much of the DOD booster request is attributed to the shuttle unavailability and, second, because NASA is a partner with the DOD on the advanced launch system and the aerospace plane.

In just a moment, my distinguished friend and colleague from South Carolina, the ranking member of the committee, will be here and I am sure that he will have an opening statement at that time.

But in the interest of conserving your time that I have already got into, I would be glad to recognize you now, Mr. Secretary, and we will recognize the Senator from South Carolina when he joins us.

STATEMENT OF HON. EDWARD C. ALDRIDGE, JR., SECRETARY OF THE AIR FORCE, ACCOMPANIED BY GEN. THOMAS MOORMAN, DIRECTOR, AIR FORCE SPACE AND SDI PROGRAMS

Secretary ALDRIDGE. Thank you, Mr. Chairman. It is a pleasure to appear before this committee again.

I do have a formal statement which I will submit for the record.

Senator Exon. Without objection, that is admitted in its entirety for the record, and we would appreciate your summary.

Secretary Aldridge. Yes, sir. Before going into the specifics of our recovery plan, I would like to make and highlight three points.

The first is that we have come through a period of great risk, and I would say, with flying colors. The reason is the absolute outstanding performance of our on-orbit satellites and ground support personnel that is associated with keeping those spacecraft operating in space. As you may know, most of our on-orbit satellites have outlived their expected life. They have performed magnificently during this period of launch hiatus and we have avoided a national security catastrophe as a result of that.

And when I make speeches out to the contractors, I pat them on the back, at least those that have built those satellites, because we have done so well in getting this through this tough period of time.

The second point I would like to make is that now is the time to structure our space launch program such that we will never have to experience a high risk period again, and we must build a space launch capability that has the assurance, the flexibility, and the redundancy that has not been the characteristic of the program in past years.

The third thing, Mr. Chairman, I would like to point out is that to do this we have no other choice but to expand our expendable launch vehicle production base. We simply must provide the launch services for operational satellites that are backlogged on the ground, that have already been procured, as well as the ones, the replacements, that we will procure over the next several years.

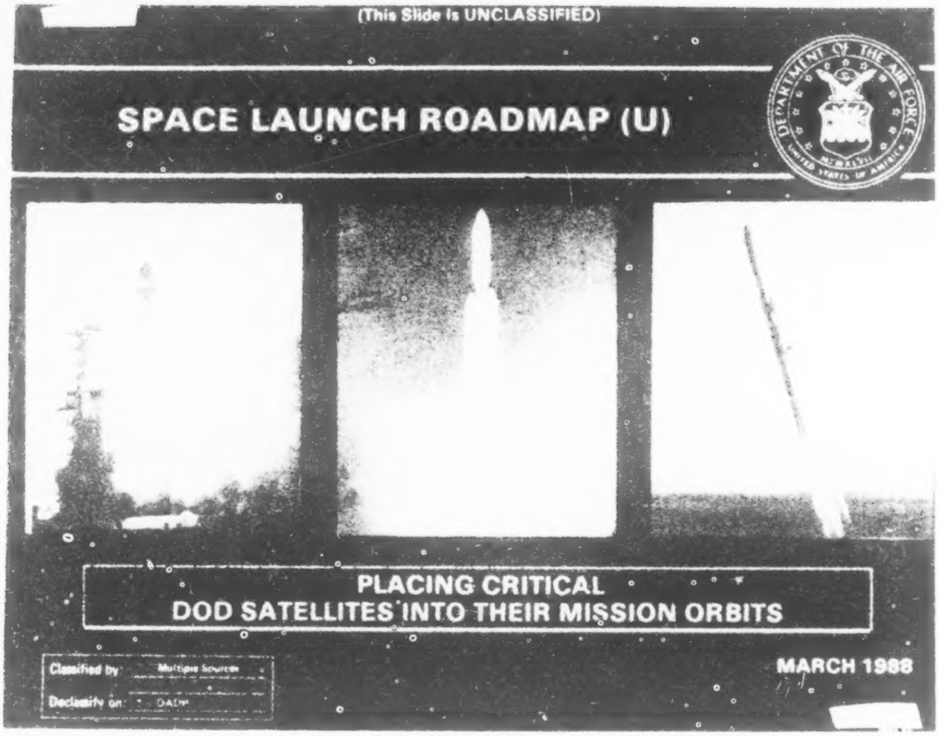
These are the satellites that are really critical to our national security, such as early warning, communications, treaty monitoring, weather and navigation systems. That is, we simply must do this in order to get our on-orbit posture back to where we think it ought to be.

There are those—and I have heard it many times—who have been arguing that we do not need these additional expendable launch vehicles, such as the Titan IV or the MLV II which is currently in competitive source selection. But let me just make the point that those who make such arguments are simply not paying any attention to the facts.

Any other solution other than not launching these particular satellites is more expensive and more disruptive to the overall space program, and it avoids a major boost to our commercial space industry. We must do this.

Mr. Chairman, I have a few viewgraphs. I would like to summarize our goals, our strategy, and our plans for the space launch of our national security payloads.

Could we have the first chart, please.



(This Slide Is UNCLASSIFIED)

SPACE LAUNCH ROADMAP (U)

PLACING CRITICAL
DOD SATELLITES INTO THEIR MISSION ORBITS

Classified by: Multiple Sources
Declassify on: OADR

MARCH 1988

DEPARTMENT OF THE AIR FORCE
UNITED STATES OF AMERICA

This briefing will summarize the space launch recovery activities we have under way.

Next chart, please.

BACKGROUND

- STRONG CONGRESSIONALLY-SUPPORTED RECOVERY PROGRAM UNDERWAY SINCE 1986
- RECOVERY PLANS EXPANDED IN LATE 1987 DUE TO SHUTTLE PROGRAM CHANGES
- NEW NATIONAL SPACE POLICY ANNOUNCED IN FEBRUARY 1988

HOW IS THE LAUNCH RECOVERY AFFECTED?
WHAT'S OUR STRATEGY?

THE PURPOSE OF TODAY'S BRIEFING

First of all, let me point out that since 1986 the Congress has strongly supported this effort. You have been very, very helpful in getting our recovery program under way and, as you know, the recovery plans have been expanded a couple of times since late 1987 due to additional shuttle program changes. Unfortunately, we have had to ask you for reprogrammings because of things that happened after you submitted your budget, and we know that is difficult for you to handle as it is difficult for us.

And the other thing that has happened is that the President has just announced in February a new national space policy. I will go over that and describe how that affects where we are going in the future.

But the purpose of today's briefing is to cover these points.

Next chart, please.

NATIONAL LAUNCH POLICY

- *THE UNITED STATES NATIONAL SPACE TRANSPORTATION CAPABILITY WILL BE BASED ON A MIX OF VEHICLES, CONSISTING OF THE SPACE TRANSPORTATION SYSTEM (STS), UNMANNED LAUNCH VEHICLES (ULVs), AND IN-SPACE TRANSPORTATION SYSTEMS. AS DETERMINED BY SPECIFIC MISSION REQUIREMENTS, THE NATIONAL SECURITY SPACE SECTOR WILL USE THE STS AND ULVs.*
- *NASA AND THE DOD WILL CONTINUE TO COOPERATE IN THE DEVELOPMENT AND USE OF MILITARY AND CIVIL SPACE TRANSPORTATION SYSTEMS AND AVOID UNNECESARY DUPLICATION OF ACTIVITIES. THEY WILL PURSUE NEW LAUNCH AND LAUNCH SUPPORT CONCEPTS AIMED AT IMPROVING COST-EFFECTIVENESS, RESPONSIVENESS, CAPABILITY, RELIABILITY, AVAILABILITY, MAINTAINABILITY, AND FLEXIBILITY.*

NATIONAL SPACE POLICY
11 FEBRUARY 1988

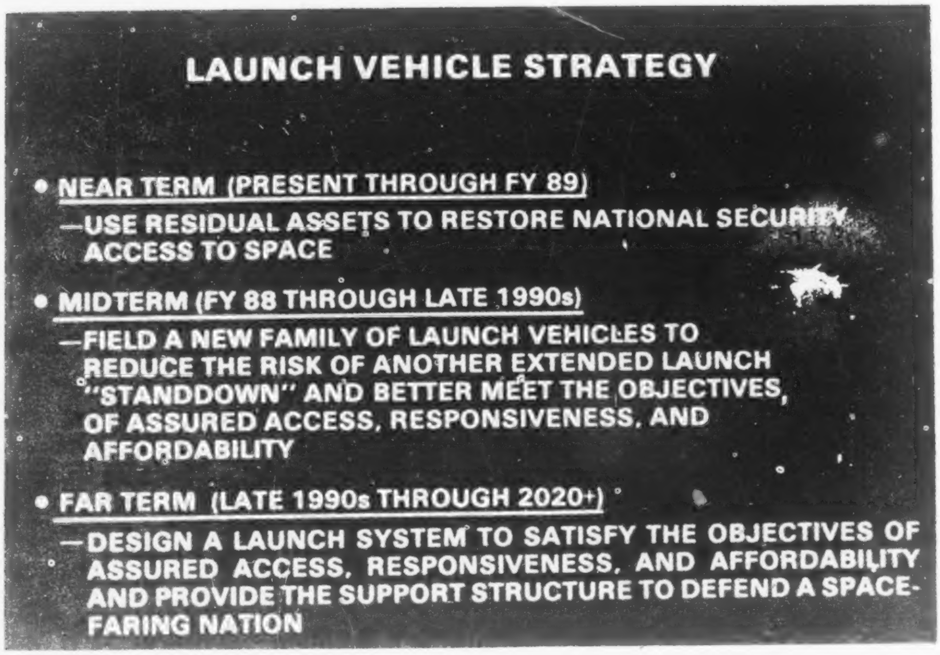
This is a summary of the national space policy as submitted by the President on the 11th of February of 1988, and there are a few words that I would just highlight on the second line and that is that the U.S. space transportation system will be based on a mix of vehicles consisting of a space transportation system and unmanned launch vehicles.

So a mixed fleet is where we are heading for the future to hedge against uncertainties that could exist if we relied on just one program.

In the second bullet, the word I would like to emphasize is "cooperate," and that NASA and DOD will continue to cooperate in the development and use of military and civilian space transportation systems. Mr. Chairman, we are doing that.

We have several programs under way, as your opening statement said, with the national aerospace plane and the advanced launch system. I will go into some of those to show you how we are cooperating in allocating our resources jointly for those programs.

Next chart, please.



LAUNCH VEHICLE STRATEGY

- **NEAR TERM (PRESENT THROUGH FY 89)**
  - —USE RESIDUAL ASSETS TO RESTORE NATIONAL SECURITY ACCESS TO SPACE
- **MIDTERM (FY 88 THROUGH LATE 1990s)**
  - —FIELD A NEW FAMILY OF LAUNCH VEHICLES TO REDUCE THE RISK OF ANOTHER EXTENDED LAUNCH "STANDDOWN" AND BETTER MEET THE OBJECTIVES, OF ASSURED ACCESS, RESPONSIVENESS, AND AFFORDABILITY
- **FAR TERM (LATE 1990s THROUGH 2020+)**
  - —DESIGN A LAUNCH SYSTEM TO SATISFY THE OBJECTIVES OF ASSURED ACCESS, RESPONSIVENESS, AND AFFORDABILITY AND PROVIDE THE SUPPORT STRUCTURE TO DEFEND A SPACE-FARING NATION

Now I would like to go into our strategy. Our strategy in the near term, which is really present through next year, is to use the residual assets we have to restore our access to space. I will show you what those near term systems are in just a few more slides.

In the midterm, we are going to field a new family of launch vehicles to reduce the risk of another extended down time, and I will show you what those vehicles are.

And in the far term, that is in the late nineties to the year 2000 plus, we are going to design a whole new launch system based upon affordability. That is basically the Advanced Launch System we have talked about before.

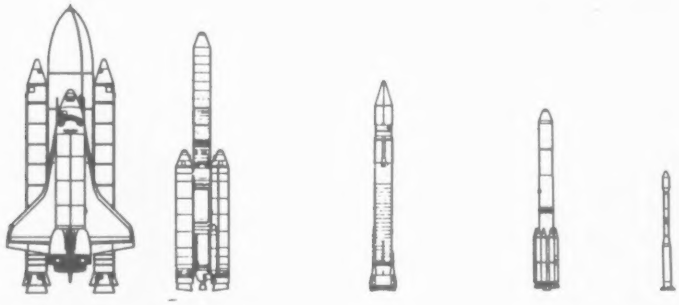
The strategy we are going to follow and the one we have emphasized throughout the development of the recovery program is that we will use the shuttle when a manned interface is required or when the cost and schedule of the program dictate that the shuttle is the best solution for our mission.

We will reinstate a very strong ELV production base consisting of multiple vehicles that can have commercial complements and we will have new and modified pads to meet highlight launch rate requirements.

And then, for the future we will pursue critical technology initiatives that increase our responsiveness, reliability, availability, and so forth. But most important, Mr. Chairman, we will pursue lowering the cost to get to orbit. We are spending entirely too much money on the launch vehicle. We need to get our cost down, and that is the primary objective of our technology initiatives for the future.

Next chart, please.

CURRENT LAUNCH VEHICLE ASSETS



LAUNCH VEHICLE:		SPACE SHUTTLE	TITAN 34D	ATLAS	DELTA	SCOUT
PAYLOAD TO ORBIT (LEO)	KSC:	42-51 KLB	32,900 LB	3,000-13,500 LB	7,600 LB	570 LB
	VAFB:	TBD	27,600 LB	1,750-3,800 LB	5,500 LB	460 LB
ANNUAL LAUNCH RATE		1 (FY 88) 7 (FY 89) 14 (FY 93)	2 (4 REMAIN)	1-2 (5 REMAIN)	1 (4 REMAIN)	2

This is a chart showing the current vehicle launch assets that we have. As you know, we are waiting for the space shuttle to fly and hopefully we will see that mission get off in August. We have four remaining Titan 34Ds.

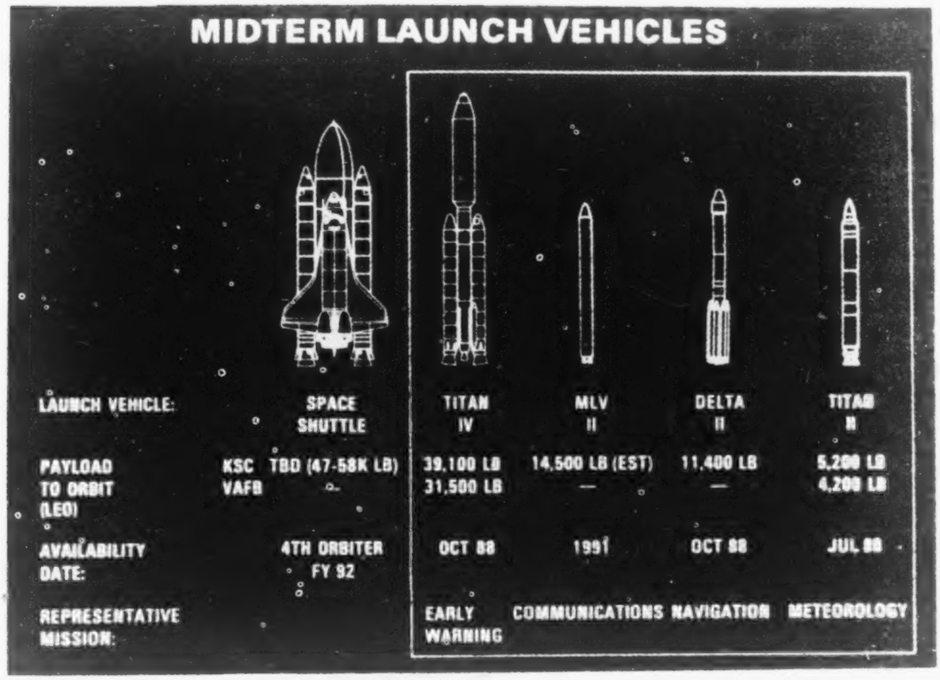
Senator EXON. Is the shuttle still on schedule?

Secretary ALDRIDGE. Yes, sir. I will let Mr. Myers, who I just talked to, go into that in detail, but shuttle is still on schudule, and it is very critical we keep that program on schedule.

The Titan 34D is currently the workhorse of the Department of Defense. We have four of those vehicles remaining and we will launch again in the very near future. We have got two successful launches off after the two failures, and we look like we are back on track.

On the Atlas', we are using some of the residual Atlas ICBMs for space launch vehicles. We have about five remaining. We have been launching them with fairly small payloads into low earth orbit for the Department of Defense, as well as some Atlas Centaurs for the FLTSAT, the Navy satellite.

The Delta, we have four Deltas remaining for relatively small payloads, and a number of smaller Scout vehicles that are remaining for very small payloads. And it's my understanding, that a Scout launch might occur today if we get lucky.



MIDTERM LAUNCH VEHICLES

LAUNCH VEHICLE:		SPACE SHUTTLE	TITAN IV	MLV II	DELTA II	TITAN II
PAYLOAD TO ORBIT (LEO)	KSC	TBD (47-58K LB)	39,100 LB	14,500 LB (EST)	11,400 LB	5,200 LB
	VAFB	—	31,500 LB	—	—	4,200 LB
AVAILABILITY DATE:		4TH ORBITER FY 92	OCT 88	1991	OCT 88	JUL 88
REPRESENTATIVE MISSION:			EARLY WARNING	COMMUNICATIONS	NAVIGATION	METEOROLOGY

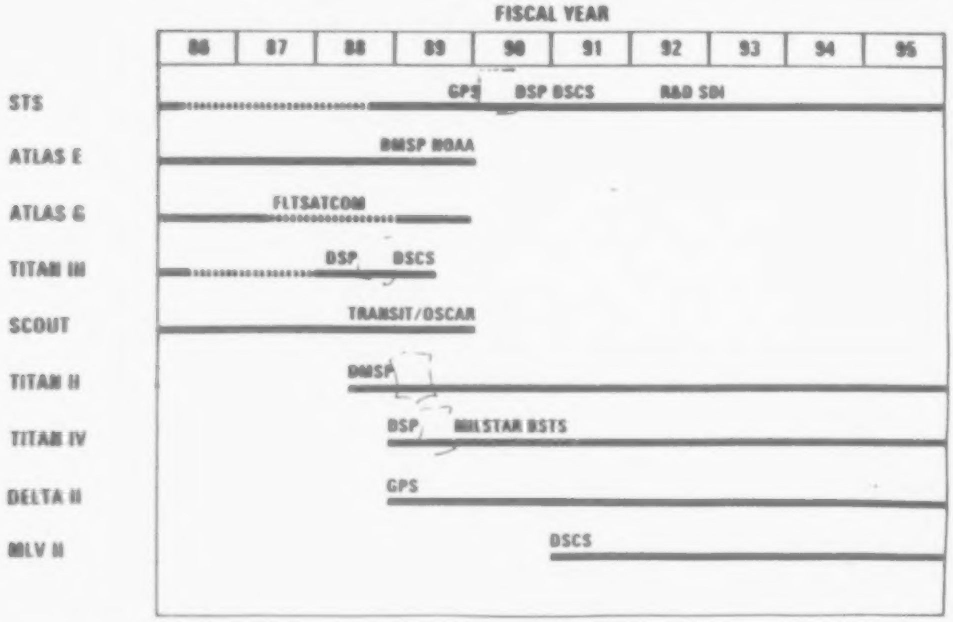
In the midterm, what we are proposing to do is to use up these existing vehicles in launching our satellites and bring in four new launch vehicles to use in addition to the space shuttle: the Titan IV, which is an upgrade of the Titan 34D, that will place essentially shuttle-class payloads into geosynchronous orbit. We plan to launch that vehicle from both Kennedy as well as Vandenberg Air Force Base.

The MLV II is a new booster which is now in source selection. It will probably be a minor upgrade of an existing booster design to launch our DSCS satellites into geosynchronous orbits.

The Delta II was a competitive procurement. It will launch our GPS satellites. And we are using the Titan II, ICBMs that have come out of the silos. We are modifying them to launch some smaller payloads from Vandenberg Air Force Base—a very useful, cost effective use of an existing ICBM much like the Atlas' in the past.

These new programs are all going very well, Mr. Chairman, and the majority of the money that you will see in our budget is basically associated with those particular boosters.

LAUNCH VEHICLE/OPERATIONAL PAYLOAD ASSIGNMENTS (U)

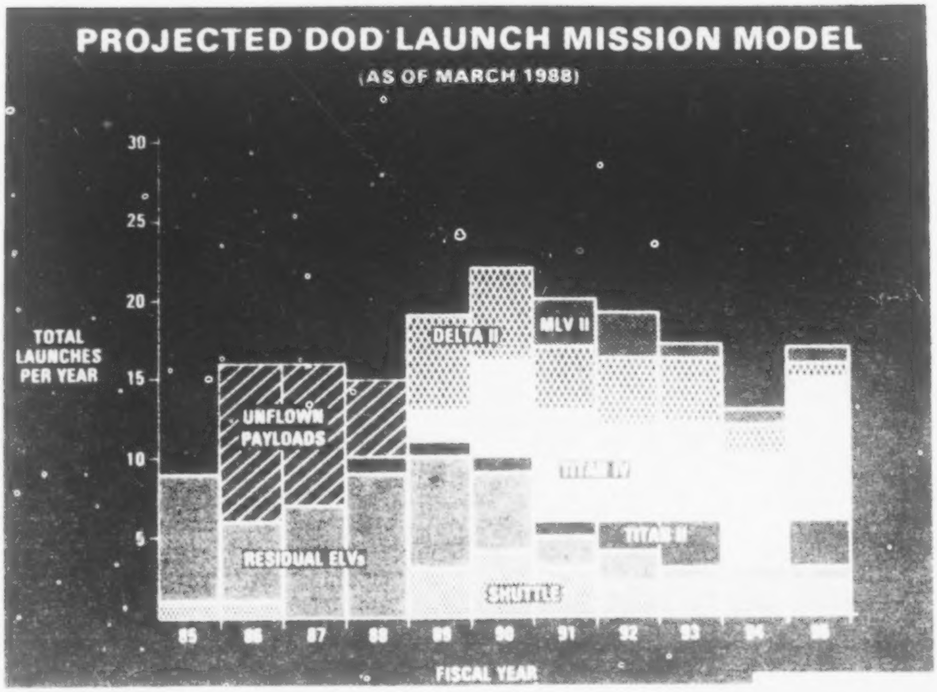


NOTE: STP AND SDI NOT SHOWN—COULD FLY ON ANY VEHICLE DEPENDING ON PAYLOAD

The next chart shows our plan and our strategy for using the Space Transportation System. It will continue to be used over the life of the Department of Defense satellites, but as older boosters go out of the fleet, such as Atlas', the Titan III, the 34D, and Scouts, we will transition over to Titan IIs, Titan IVs, Delta IIs, and MLV IIs.

Let me point out, Mr. Chairman, that on this particular booster, you will see the satellites that are being launched: the DMSP is our weather satellite; [deleted]; MILSTAR; the Boost Phase Surveillance and Tracking System, the [deleted] GPS, our navigation satellite; and DSCS is our communications satellite.

All of these systems are ongoing satellites that are essential for the operation of our national security programs.



The next chart shows the booster mix, how we are planning to use those systems and the launch rate that we are talking about for 1989–95. And Mr. Chairman, let me just point out the red hash area of that chart. Those are unflown payloads. Those are the payloads that are sitting on the ground that would have flown if the shuttle and Titan accidents had not occurred. They are yet to be flown. We are planning to fly those off as quickly as we can with expendables or shuttles, depending on what is the optimum design.

And as you can see from where we are today, the blue area and the yellow, we will build up very rapidly over the next year or two flying off those payloads, and then we will settle down to more of a steady state launch rate in the out years.

Basically, through 1992 we will be flying off all of the residual satellites that have been sitting on the ground since the 1986 accidents.

Senator EXON. Mr. Secretary, I am sorry, I have to go for a vote. I was hoping Senator Thurmond would be back. If he comes back he will reconvene. But in any event, I will be back in 3 or 4 minutes.

[Recess.]

Senator THURMOND [presiding]. Secretary Aldridge, we are glad to have you with us.

Without objection, I will just put my opening statement in the record.

[The prepared statement of Senator Thurmond follows:]

Prepared Statement of Senator Strom Thurmond

Thank you, Mr. Chairman. I join you in welcoming Secretary Aldridge before the subcommittee this afternoon, and wish to express my appreciation to the Secretary for bringing us through this very critical passage in our military space program. Mr. Secretary, it has been largely through your leadership, and the excellent military and civilian team that you direct, that we are on the brink of restarting normal military space launch operations.

Mr. Chairman, before I comment on Secretary Aldridge's statement, I would remind the Chair that the committee has pending before it, a reprogramming action affecting our space launch recovery effort. I am not aware of any problem with either the purpose of, or the source of funding for this action and would therefore ask that the committee act quickly to approve it. I know that would make the Secretary's job easier.

The importance of our military space effort is well known to this committee, and that importance is underscored by the budget allocated to this purpose. The budget request for unclassified space booster and support programs, not including the considerable command, control and communication satellite programs, amounts to over $2.3 billion in fiscal year 1989. I am really concerned, Mr. Chairman, that the budget squeeze that is now on the Department of Defense, may make it very difficult to carry through on some of these programs, in particular, on the Advanced Launch System and the National Aerospace Plane.

I think it will be critical in the years ahead to focus our scarce defense resources only on those purposes with a direct application to our national security. While I recognize that our national space policy has a necessary commercial and civilian space component, and I am glad to see that, I do not believe that we should underwrite those activities from dollars identified for the defense function.

Mr. Chairman, I will have some questions for Secretary Aldridge at the appropriate time.

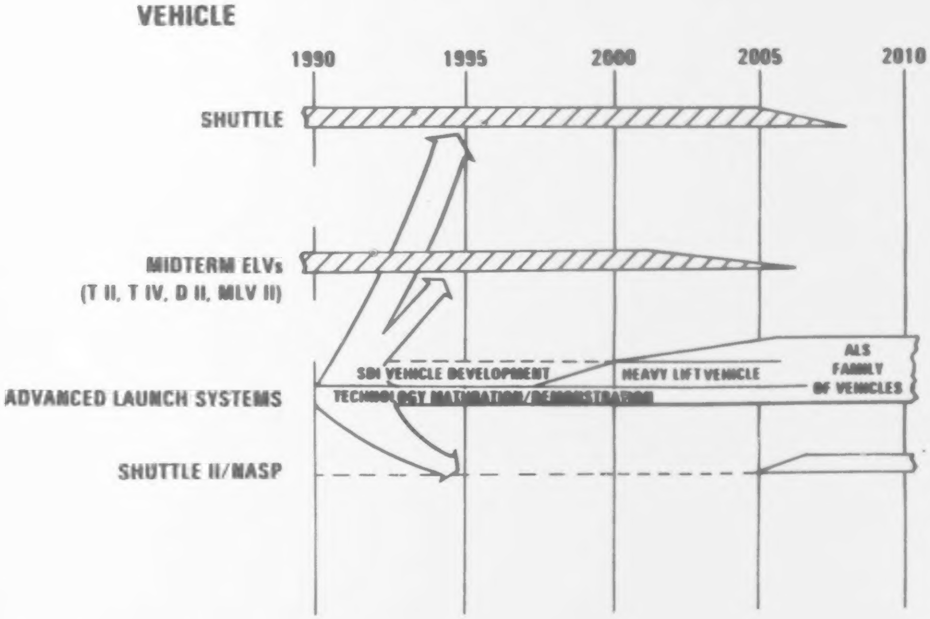
Thank you, Mr. Chairman.

Senator **Thurmond**. Secretary Aldridge, you may proceed.

Secretary **Aldridge**. Mr. Chairman, I was involved in a discussion of the launch strategy and our plans for recovery from the accidents that we have had over the past years. What we are going to do is restore flexibility and redundancy in our space launch program.

I just described a series of actions that we plan to undertake, the result of which is shown in this particular viewgraph, showing the mix of flight vehicles we will have to fly off our inventory of satellites that we plan to launch into an operational status.

SPACE TRANSPORTATION SYSTEMS

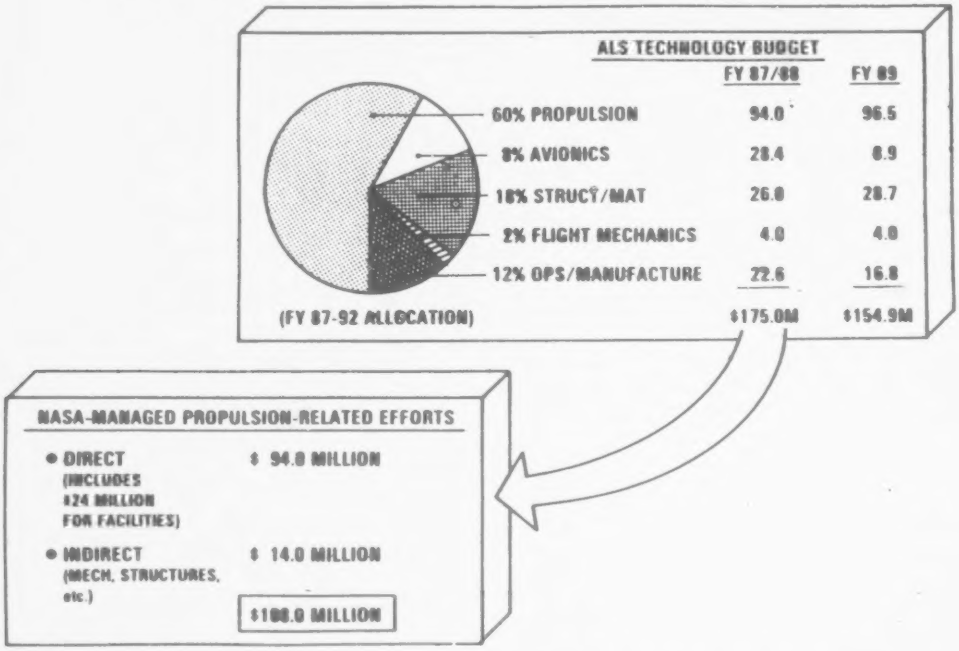


The next chart shows the relationship of that plan to the future. We have a program which we call the Advanced Launch System, which is really a family of vehicles that can be used for improving and reducing the cost to place a satellite in orbit.

What we have now is a technology program, a joint technology program between ourselves and NASA, that will have as its goal the production of low cost ways to get to space. These methods can also be used to improve the existing booster inventory, as I show by these arrows.

We can spin off those technologies into ongoing programs as well as be prepared, should the need arise for the future, to build a heavy lift vehicle of some type to support either Department of Defense or NASA requirements. Although the program is heading toward a capability in the late 1990s, it can be used to improve the cost effectiveness of the ongoing booster programs.

ALS INTEGRATED TECHNOLOGY PLAN



ALS TECHNOLOGY BUDGET

	FY 87/88	FY 89
60% PROPULSION	94.0	96.5
8% AVIONICS	28.4	8.9
18% STRUCT/MAT	26.0	28.7
2% FLIGHT MECHANICS	4.0	4.0
12% OPS/MANUFACTURE	22.6	16.8
(FY 87-92 ALLOCATION)	$175.0M	$154.9M

NASA-MANAGED PROPULSION-RELATED EFFORTS

● DIRECT (INCLUDES $24 MILLION FOR FACILITIES)	$ 94.0 MILLION
● INDIRECT (MECH, STRUCTURES, etc.)	$ 14.0 MILLION
	$108.0 MILLION

The next chart shows how we have allocated our resources for the ALS effort. In fiscal years 1987 and 1988, we have about $175 million that has been identified for the technology effort associated with ALS. About $108 million has been allocated to NASA as their part of the joint effort.

Their effort is primarily in the propulsion area. At least a great percentage of the money will be used in that area. The remaining will be used by our contractors to define the concepts and ideas necessary to develop a future capability.

We have about $200 million total allocated in fiscal year 1989 to the ALS effort, of which $154 million are allocated to particular technologies. The remaining is associated with contractor effort necessary to continue on design.

SPACE BOOSTERS FUNDING
(THEN-YEAR MILLIONS OF DOLLARS)

	FISCAL YEAR		
PROGRAM	87	88	89
STS	416	386	355
TITAN IV	825	768	947
DELTA II	269	257	211
TITAN II*	363	234	99
MLV II	0	67	137
ALS†	85**	150**	200
TOTAL	1,958	1,862	1,949

*INCLUDES TITAN 34D AND ATLAS-E (FY 87-89 FLYOUT) PLUS TITAN 34D RECOVERY
**INCLUDES $38M (FY 87) AND $70M (FY 88) TO NASA
†SDIO FUNDING

In total, what we are asking for as part of our recovery plan for these past 2 fiscal years and the new fiscal year coming up are shown by this chart. The Space Transportation System is what the Department of Defense pays for shuttle operations at Kennedy, at Vandenberg and Johnson Space Flight Center, as well as some of the efforts associated with flight preparation of the shuttle for Department of Defense payloads.

The remaining efforts are shown in these charts for the 34D and Atlas, the remaining funding as we phase down that program. The Titan IV, the Delta, Titan II, and MLV II are acquisition programs for the boosters necessary to fly the operational payloads as we use up existing boosters. Finally, the programs which are for the future are shown in the Advanced Launch System line, which grows to approximately $200 million in fiscal year 1989.

There is yet to be defined an ALS concept because we are still working on that. We will be spending all together roughly $2 billion a year for this space launch operations and development effort, and that will be a fairly stable amount over the next several years.

Mr. Chairman, in summary, I would like to point out that 1988 and 1989 are really pivotal years for the space launch recovery effort.

SUMMARY

- **FY 89 IS PIVOTAL YEAR IN SPACE LAUNCH RECOVERY**
- **CONTINUED CONGRESSIONAL SUPPORT VITAL IN MAINTAINING RECOVERY PROGRAM MOMENTUM**
  - **—PROMPT ACTION REQUIRED ON FY 87/88 REPROGRAMMING**
  - **—PROVIDE FOR FY 89 NEEDS**
  - **—SUPPORT MLV II ACQUISITION FOR DSCS**
- **ASSURED RESPONSIVE ACCESS TO SPACE DEPENDENT ON NATIONAL COMMITMENT AND TRANSITION TO ADVANCED LAUNCH SYSTEM**

We have recovered from the Titan accidents. We have flown two successful missions of Titan, and we will fly the Titan IVs, the new Titan vehicle, late this year in October.

We will fly the Titan II ICBM requalified for space launch in July. We will fly the Delta II vehicle in October, and as we look at the remaining part of the space recovery program we will be flying at a fairly substantially and increasing rate over the next couple of years.

But it all starts in fiscal year 1989 with the ELVs, as well as the shuttle in August.

We need your support, Mr. Chairman, for several actions. We have some reprogrammings that are waiting on the Hill for approval. This committee is holding up two reprogrammings for us. We need your help in getting those released and we would greatly appreciate your support for the fiscal year 1989 program that we submitted before the committee.

We need your support for the MLV II competitive acquisition which is under way now, and we need to get release of funds for the Advanced Launch System so we can get our contractors back to work to define the new technologies that can save us space launch money in the out years.

And of course, we need your support on the technology program for ALS, because it really is the basis for our future space launch capability.

Mr. Chairman, that summarizes my input on the space launch strategy program that we must implement to get us back into space for sure. Thank you.

[The prepared statement of Secretary Aldridge follows:]

SUBJECT: SPACE LAUNCH RECOVERY

STATEMENT OF: THE HONORABLE EDWARD C. ALDRIDGE
Secretary of the Air Force

Mr. Chairman and Distinguished Members of the Committee:

It is a pleasure to appear before you again and inform you on the progress of our efforts in the DoD Space Launch Recovery Program. Your support has been the key element to obtain the resources necessary to maintain a clear, objective recovery plan, and your continued support is absolutely essential to regain the launch capability to execute critical national security space missions. My remarks today will provide the committee with an update of what still must be done to complete the remainder of the recovery plan and what help we need from you to get the job done.

Two years ago, the nation was still in shock over the tragic loss of the Challenger and less than a month away from another Titan launch failure that would ground all U.S. large payload launch capability for over eighteen months. I want to state firmly today that we have just crossed through a period of great risk, and we have come through it successfully.

We were able to do this beause of several factors. First, and most important, is that our on-orbit spacecraft have continued to provide mission data far beyond their design life. When critics cry out that the U.S. has lost it's leadership in space, we can point out that our spacecraft, in quality and durability, are second to none and played the key role in this chapter of U.S. space history.

Second, our personnel on the ground, who are charged with the around-the-clock operation of our spacecraft, have displayed the highest professionalism, competence and ingenuity. Those men and women-government and contractor, military and civilian--have been under continuous pressure to satisfy mission requirements and maintain operational capability. They have done an outstanding job and like our spacecraft they are second to none!

This success does not, however, mean that we can reduce the requirement to buy more boosters and satellites. I assure you that our space launch plans have already taken into account the data and knowledge we gained in operating our spacecraft into regimes beyond specification and design. The boosters and satellites we have included in our Fiscal Year 1989 request are needed if we are to maintain a healthy, resilient national security space posture.

1987 was a year of revalidation for our existing expendable launch systems. We had successful launches in all our existing boosters--Atlas, Scout, Delta and Titan. The most important launch occurred in October when our heaviest booster, the Titan 34D, returned to service. Back-to-back missions in October and November demonstrated that the recovery is complete on that system. In February 1988, we demonstrated the ability to react to critical on-orbit spacecraft problems by launching a replacement Defense Meteorological Support Program spacecraft using emergency call-up procedures.

Mr. Chairman, with these successful launches, I think we can say the DoD space launch capability is back in business. However, I don't want that statement to be misunderstood. We will use the remaining boosters in our existing inventory to replenish on-orbit assets, but we can't replenish those satellites quickly enough to meet standing requirements. Shuttle-class payloads and others like the Global Positioning System satellites can't be launched until Shuttle launches resume and our new expendable boosters reach launch readiness. This is still a very critical time for our space programs and we anxiously await several key milestones. The next nine months will mark the most significant steps yet to complete the space launch recovery.

In July, we return the Titan II to the Air Force active inventory. Formerly, it supported our national defense strategy as a part of our strategic missile force. Now, we have converted it to support important national security space missions launched from Vandenberg AFB CA. The pad is ready, and vehicle and space craft processing will soon be complete for our first mission.

In October, two more boosters, the Titan IV and Delta II, will be ready for launch operation. The Titan IV will replace the Titan 34D as our heaviest unmanned vehicle. As you will remember, Congress approved the Titan IV in 1985 as a complementary expendable launch vehicle to the Shuttle until it was fully operational at a rate of 24 flights per year. The foresight of that decision has reduced launch recovery time for our Shuttle-class payloads by a full two years, and the Congressionally approved increase in Titan IV procurement to 23 vehicles will offset some of the reduced Shuttle availability and performance over the next three years.

The Delta II will launch the Global Positioning System (GPS) satellites that had to be off-loaded from Shuttle. Unlike the Titan IV and other vehicles, the Delta II is a direct fallout from the Challenger accident in 1986. Delta II will launch GPS spacecraft at a rate of up to six per year to achieve the operational constellation.

This brief summary highlights the progress we have made in the space launch recovery program over the last few months and what is ahead this year. There are other aspects to the Space Launch Recovery plan just as vital as the boosters I just discussed.

The Titan accident at Vandenberg clearly demonstrated the vulnerability of our launch capability when we depend on a single launch pad for important national space assets. It cost approximately $60 million to repair the damage that resulted from the booster explosion just above the pad. Consequently, our downtime on the Titan 34D included pad repairtime as well as time to identify and fix the solid rocket motor problem that caused the accident. If the explosion had occurred on the pad the downtime could have been more than two years for recovery. This is why our launch recovery plan includes additional pads and pad capacity on both coasts. Launch complex 40 at the Cape will be converted to a dual capable launch pad that will support both commercial Titan III and DoD Titan IV operations. A second Titan IV pad with a Centaur upper stage capability will be built at Vandenberg to meet increased launch requirements in 1995. We can't totally eliminate our vulnerability to catastrophic pad accidents but we can significantly reduce the risk and potential impact of accidents on our launch capability through these actions.

Additional production capacity for Titan IV payload fairings and solid rocket motors is necessary to meet the increased launch rates beginning in the early 1990's. Launch pads and production augmentation will increase Titan IV launch capacity to 8 to 10 missions per year and permit us to support potential NASA planetary (or national science) mission requirements, along with DoD needs.

In October, I told you of the the need to procure a Medium Launch Vehicle (MLV II) capable of boosting the Defense Satellite Communication System (DSCS) spacecraft. Further adjustments to the Shuttle schedule since then emphasize the importance of that decision. We need to complete that competitive procurement and, from my initial understanding, achieve a significant reduction in DSCS launch costs as well.

Now that I've reviewed DoD's progress in the space launch recovery area and what remains to be completed, I'd like to emphasize what Congress can do to help us keep the momentum going. The priority for DoD and the Nation is to complete the space launch recovery program. We made a tragic policy error in the late 1970's by deciding that Shuttle would be the only means for launch of our space systems. We have paid dearly for that mistake in recovery costs and risk to our national security. It will cost the Department of Defense over $10 billion and six years to restore our on-orbit assets to a healthy constellation and obtain a balanced distribution of payloads on a mixed fleet of expendable vehicles and the Shuttle.

Our planned launch rate in 1988 is 10 missions and it will almost double in 1989 to 19. While our planned launch rate peaks in 1990, we will not have launched all our backlog of satellites sitting on the ground until 1992. These are satellites we need in orbit to meet the full gambit of requirements. Therefore, we need your continued support to complete the recovery program and to establish a space launch infrastructure that will preclude similar impacts if a future launch accident occurs.

When the plan is completed, DoD payloads will be distributed among six launch vehicles ranging from Shuttle and Titan IV at one end of the spectrum to Titan II and Scout at the other end. Our plan achieves a spacecraft distribution in 1991-1995 that will vary from 10% on Titan II up to 41% on Titan IV. Shuttle will provide about 14% of our required launch support. This is significant progress toward the National Space Policy signed by the President on February 11, 1988, which states: "Payloads will be distributed among launch systems and launch sites to minimize the impact of loss of any single launch system or launch site on mission performance." With your support, we will realize this goal and will have moved a long way towards our objective of assured access to space.

Reinstatement of a strong expendable vehicle production base and infrastructure is essential in meeting midterm launch strategies leading to assured access to space. Development of a strong competitive U.S. commercial launch complement is a fundamental element of the new national space policy.

The Air Force has vigorously supported and will continue to support the development of this industry. The launch vehicle competitions for the Titan IV and Delta II procurements had direct commerical implications, and we expect that will be true for the new Medium Launch Vehicle (MLV II) as well. In the area of commercial launch operations, we have developed agreements facilitating private sector access to appropriate government space-related facilities and hardware for a variety of commercial launch firms. Final agreements have been signed with three firms and several others are near completion. U.S. companies have signed a number of commercial launch contracts and others are pending. In addition, the Air Force has been an active supporter in U.S. trade representative-led discussions to "level the playing field" with the European Space Agency. We have also supported the Economic Policy Council in the development of commercial space initiatives. We must work closely together to assure industry that the government will continue real action in this area to foster growth in the private sector and the commercial use of space.

Finally, Mr. Chairman, the Congress can play a decisive role in moving the Nation toward a new future in space launch capability. When we look at the space boosters being brought into the DoD inventory to implement the launch recovery plan and achieve a mixed fleet policy, we see only derivatives of the ICBMs designed and produced in the 50s and 60s for a different mission. These modified and upgraded systems will meet our current performance requirements, but we will need big improvements in many areas to meet future needs. Increased capacity; increased reliability; responsiveness to provide faster call up; flexibility in satellite assignments and integration; resilience to accidents and other threats; and lower, more affordable launch costs are areas that will lead to better launch support to meet the Nation's security requirements and improve support to our tactical commanders worldwide.

Many of these improvements can be achieved with today's technology, but we need to focus on a sound acquisition stategy to secure these mission ojectives. We have identified the Advanced Launch System program, ALS, as the solution. Some still think of ALS only as an SDI requirement. That is incorrect. ALS is the future for our national space launch capability. ALS is a program with three important objectives. First, it must provide the required launch capability if a decision is made for a Strategic Defense System deployment.

Second, ALS must develop technologies, system designs and operational concepts for the next generation of responsive launch vehicles. These vehicles would be acquired and phased-in during the late 1990s or early 2000 timeframe and would provide the capability to meet requirements from the heaviest to the smallest payload. Most importantly, they would meet cost, flexibility, responsiveness, capacity and assured access goals.

The third is an important area where real near-term benefits can be gained. We can spin off applicable ALS technology achievements to our existing launch systems (ELVs and Shuttle) to increase their reliability and performance. This will ensure that we will have the launch capabiltiy we need during the 90s.

At this point, I should mention the National Aero-Space Plane (NASP) and contrast that program to ALS. ALS is a program of available technology application to meet late 1990s or early 2000 space launch needs. NASP emphasis is on development of highly advanced technologies and their possible use in future airbreathing propulsion systems or NASP-derived manned vehicles after the turn of the century.

ALS can meet not only DoD's but the Nation's space needs in the foreseeable future. Therefore, it is a national program. The joint DoD/NASA program management structure and agency responsibilities are described in the President's Report to Congress. The program makes use of the best talent and facilities available within NASA, DoD and industry to achieve the goal of assured access to space for the Nation.

In conclusion, I want to emphasize that the U.S. is not alone in space. The Soviets continue to improve a substantial capability in launch systems and extend the performance of their on-orbit assets. To maintain a credible deterrence requires that we totally recover and continue to improve our own space capabilities. Our forces depend on space systems for weather, communications, navigation, warning, and treaty verification. They need these systems today and they will need them even more in the future. I firmly believe that with your support of the space launch programs and priorities I have discussed, the Nation will be able to meet not only the challenges we face now but the unseen ones we will inevitably face in the future.

Mr. Chairman, that concludes my remarks. I will be glad to answer any questions you or the members of the committee have.

Senator Exon [presiding]. Thank you.

I am pleased to recognize Senator Thurmond at this time for any remarks he has to make before a previous commitment that I know he has that he has to keep.

Senator Thurmond. Thank you very much, Mr. Chairman. I want to commend you for holding this hearing. I think it is a very important hearing, and I am glad to see Secretary Aldridge is here and I think he is doing a fine job as Secretary of the Air Force.

I would remind the Chair that the committee has pending before it a reprogramming action affecting our space launch recovery effort. I am not aware of any problem with this action, and therefore would suggest the committee act as quickly as possible to approve it.

I know that you could make the Secretary's job much easier if you could arrange to do this.

And thank you very much, Mr. Chairman.

Senator Exon. Thank you very much, Senator. And we appreciate very much your input and your faithful attendance to our subcommittee meetings.

Mr. Secretary, there are numerous questions for the record that I would advise you will follow from myself and probably other Senators. And we would ask that you reply as promptly as you could to those.

I must apologize once again for the hearing being interrupted for a second time. When I get to be majority leader, all that is going to change, of course. [Laughter.]

There are some key questions, though, that I would like to go into with you now, and then if you would agree to answer the others for the record as promptly as possible we would appreciate that.

Secretary ALDRIDGE. Yes, sir, we will.

Senator EXON. Let me start out with what I think are the committee's main or primary concerns and ask you to respond. These are general questions, but be as specific as you can.

LAUNCH PADS AND BOOSTERS

We see an Air Force plan that in the near future demands new launch pads, more investment in production facilities, and more boosters. And I touched on this in my opening remarks, but the need is way, way out there in 1995 and beyond, and it is not clear that those schedules will all be met.

The committee sees great likelihood that the space station will slip and the shuttle flights will be available. The Air Force plan does not project what happens to all of these pads and production facilities when all of this comes in and comes together. The committee worries about all of this and is greatly concerned about where we are going to get the Titans, how they are going to operate, and what goes on, and what about the DOD payloads, and will they be met, and if these near term investments will constitute a big give-away to commercial users, as opposed to the key national defense interests of the United States.

And I am not saying that you as Secretary of the Air Force are not very, very much concerned about our military need. But I guess what we are thinking about is, we want to make sure that the funding levels that come out of this subcommittee and this committee as a whole are legitimately in the interests of national security, and we do not want to have equal sharing of expenses that we share the burden for, to be too much beneficial to other than national defense.

And that is a pretty broad question, but if you could reassure us to some extent on these matters I think it would be extremely helpful.

Secretary ALDRIDGE. Mr. Chairman, I cannot emphasize strongly enough the need and my assurance that the funding that we are asking for, for these expendable launch vehicles is absolutely essential. We have already bought the satellites that we are talking about launching.

It is not an issue that we have any discretion or any choice in this matter. These are satellites that are operational. They are early warning satellites. They are satellites used for weather. They are satellites used for the very critical job of [deleted] which, as you know now, are gaining higher interest.

These are not satellites that are launched for research and development purposes. These are systems that are the backbone of our national security strategy. We have to have these systems, and we must buy the launch vehicles necessary to fly them.

We have two choices in that matter. We are going to fly them on the shuttle. We would like to have flown them on the shuttle. But unfortunately, the accident has caused a delay in getting those on-orbit and getting the shuttle flying again. And we know now that when the shuttle flies again, the launch rate will buildup slowly. It will take a while before the confidence level builds up again to the point where there will be a sufficient shuttle launch rate to be used.

There was also concern when the decision was made to cancel the shuttle Centaur program. We require the Centaur upper stage to launch many of these satellites because of their weight. We now have to use expendable launch vehicles to launch these satellites and we have to use expendable launch vehicles as those satellites that we need to launch for replacement of existing on-orbit assets during this near-term time frame.

What we ask for is the purchase of the boosters to launch the satellites that this committee has already procured and will procure over the next several years for national security purposes.

What we ask for is that those launch programs be funded at the rate at which they are needed, no faster, no slower, and with the types of vehicles that are the most cost effective for each satellite that we are talking about. There is no need to fly a Titan IV for a DSCS satellite because the Titan IV is far too large.

So we are going to try to buy the most economical booster for that satellite under a competitive environment and that is under way now. We have found each booster and designed the booster to launch the particular satellite. Now, there is a benefit to this. We now have a production base that is of benefit to the Department of Defense and to this country, and a commercial space launch industry that can now grow and begin to take payloads away from Ariane and other foreign boosters and bring them back to the United States.

And we have that capability because the Department of Defense has paid for that production base in developing launch systems to meet our security needs. But, it is a side benefit. We are not subsidizing any industry for this.

They are in fact paying us for the use of the ranges that they would use to fly the boosters. But we get the benefit of lower unit costs. We get the benefit of technology staying in this country rather than shipping our satellites to France or China or some other place to be launched.

So it is of great benefit for all of us, and it is because of this ELV industry we are capable of doing that. So we are going to benefit all around for that. I do not believe there is any reason for concern that the Department of Defense paying or subsidizing industry for the use of these capabilities.

Yes, we will have to augment our production facilities, but the reason we have to augment them is because we need to increase our flight rates to fly off the satellites that have been sitting on the ground far too long.

We need some additional production capabilities for solid rocket motors. We need an additional Titan IV pad because the flight rate is going up and one pad on each coast won't do. We were getting out of the business before. We had no long-range plans for the use of expendable launch vehicle facilities once shuttle was fully operational.

But now the expendable launch rate is building. We cannot fly enough vehicles off the two pads that we currently have planned without tremendous risk and, consequently, without the very high likelihood that launch dates will be delayed. So we are investing in pad construction, launch facility construction and with production facilities to meet our basic requirements and not to subsidize the commercial industry. We get the benefit of the commercial industry through a lower unit price for us, but that is not what our recovery program is all about.

Senator EXON. Well, that was very helpful. I guess what you are saying is that the benefits that private industry would have they are going to pay for, and we have to do what we have to do in any way to get there.

So the net result is that some private sources are going to benefit, but that has nothing to do with the priorities that you are setting in the program.

Secretary ALDRIDGE. No, sir. Let me give you an example of one. We have to fly our global positioning satellites, which are critical for the navigation system for both submarines and bombers and Army units on the ground. GPS will be used by a great variety of people. We were going to fly those satellites on the shuttle, and unfortunately the delay is such that we have now produced the GPS satellites but don't have a way to launch them.

We are still going to fly some on the shuttle, but most of them will be flown on the booster we call the Delta II. We competed for that launch vehicle and had several competitors respond. We picked the Delta II at a very, very inexpensive price. Because the Delta II is capable of launching GPS, it is also capable of launching small communications satellites.

We are going to buy about 20 Delta IIs, at least in the initial buy. McDonnell Douglas, who builds the booster, can now sell Delta IIs to commercial users to launch small communications satellites at a very, very good price. But we also get the benefit of that commercial price.

Every time they sell a commercial Delta II, we get a unit cost reduction for ourselves. They are going to use the launch pads at Kennedy Space Center, pads 17A and B. That does not cost us anything because they can fly these commerical boosters within the launch capacity of the pads and will pay us a certain marginal cost for the use of those pads, so we are not subsidizing them. We are not giving them away. They will pay whatever incremental price it will be.

But those payloads no longer have to fly on a foreign booster. They can now fly American, and that is a great benefit to us.

Senator EXON. Well, Mr. Secretary, we really do not have, do we, a 5-year plan to correspond with the new budget? I do not think we do.

Secretary ALDRIDGE. Sir, we do.

Senator EXON. We do?

Secretary ALDRIDGE. Yes, sir, absolutely. The plan you just saw is the 5 year plan that fits within the current budget that we are planning within the Department of Defense.

Senator EXON. Does that take into consideration the $175 to $300 billion cut that the Secretary——

Secretary **Aldridge**. It does.

Senator **Exon**. Therefore, are you sure beyond a reasonable doubt that the request that you are making here with regard to the ELVs and facilities that go with them are really going to be there?

I guess that assumes that the program is going to go pretty much on schedule as you have outlined here. At least you have taken into consideration and are being honest with us as far as numbers are concerned, that this can and will fit into the 5-year plan even with the reduced funding as recommended by the Secretary?

Secretary **Aldridge**. That is correct. We have laid out a program that meets the funding constraints of taking a $300 billion reduction. And I can remember to the very last nickel the $97 billion that came from the Air Force budget. We have provided the funds to carry this booster program consistent with the satellite programs that we believe will be introduced and required by the Department of Defense.

It includes programs such as MILSTAR, such as the Boost Surveillance and Tracking System, and other satellite programs which are funded in the DOD 5-year program. Now, there could be some uncertainties as to precise dates at which those programs are brought in, but our plans reflect the dates as well as we know them at this time.

This program lays out the flight rates, especially in the near term, and the production rates that are necessary to support all of these satellite programs, and not one nickel more, because obviously—with those kinds of budget pressures—you cannot afford to be very sloppy in your analysis of what you need and when you need it.

But this program fits within our budget and is absolutely necessary, Mr. Chairman. There are no satellites in there which are discretionary. As I pointed out before, every one of them are satellites that you, this committee, has funded—or will fund over the next few years as replacements for existing operational systems.

These are not satellites that you have the choice of whether or not to launch. They must be launched. You have already paid for the satellites and as I pointed out, they are sitting on the ground waiting to fly.

You have no choice other than not launching them, and that is certainly an unacceptable position from the Department of Defense's point of view. Many of these satellites and many of the most critical ones, using the most expensive boosters, are the ones which are going to allow you to do [deleted] in the future.

They are absolutely essential for that purpose.

OFFICE OF TECHNOLOGY ASSESSMENT

Senator **Exon**. Mr. Secretary, let me take you into another matter that is of concern to the committee. And I hope that you are thoroughly familiar with this, because it is a major problem in the committee. I think you are aware of the fact that Chairman Nunn and the ranking member, Senator Warner, commissioned the Office of Technology Assessment to do a study of the Air Force's space access program.

And we are advised by that agency that they are having a great deal of difficulty getting information and cooperation from the Air Force. I have a letter here that I am going to read just parts for the record that kind of sets the stage, and I would be very much interested in your response to all of this.

I am reading a letter of March 18 from the Office of Technology Assessment to Chairman Nunn and members of the committee, and they say:

> Unfortunately, the OTA has been unable to obtain the data necessary to carry out the analysis that you requested. We sought to address three major issues: One, whether some of the payloads in the Air Force's plan will be deleted or delayed, in which case less launch capacity would be required. Since many of the projected Titan IV payloads are for special missions, this question cannot be answered without Codeword access. Our staff has the necessary clearance, but the Armed Services staff cannot certify our need to know.
>
> And two, whether the Air Force budget request for a space launch recovery program is solidly grounded. The committee staff has shared with us the information supplied by the Air Force supporting their request, but we found it to be superficial and inconsistent with information we obtained from the contractor briefing.
>
> The Air Force has not responded to our repeated requests for more detailed data.

And then the letter goes on. That is what we are hearing from OTA.

What is your explanation of that?

Secretary ALDRIDGE. Can I give you my reaction, and I will apologize ahead of time. Baloney! I hate to be quite so blunt.

Senator EXON. No, I like people who are blunt.

Secretary ALDRIDGE. My understanding is that there is a lack of communication in this particular matter, and in fact, the information they are looking for is not ours to release. We have been working with the OTA trying to get the information released to them. But there is no intent whatsoever from denying OTA legitimate access to information necessary for them to do their job.

I think we have got problems with lack of communication. That is not the intent of the Air Force. It is not the intent of the Air Force to withhold information. It is our intent to cooperate fully with them.

But there are some things that they are asking for that maybe we cannot provide. That data is not under the control of the Air Force. But that should not be interpreted that we are being uncooperative. That is not the case at all. We will cooperate, and I think we need to work with OTA to make sure that they understand what we can provide and what we cannot provide.

Senator EXON. Well, how are we going to work our way around that? We are looking to them for reports and they say they cannot get the information necessary to provide us with the type of report we want.

Is there some way you could cooperate with them and give them all the information that you can, and get into Codeword material? And could you or your designee come before our committee at Code level so that we could try and work all this out?

Secretary ALDRIDGE. Absolutely.

I really think there is a problem in what they think they need to get their job done and what they really need to get their job done. There are some programs, Mr. Chairman, that they do not need detailed information about. They do not need to get into details of very sensitive programs that we have under way. They do not need that.

And I think it is just a matter of pointing out what is necessary for them to do their job. We will do that, we will absolutely do that. I am committed to that. I have never denied information to people who need to know, and you can be assured that we will work with them to try to get them the data necessary to do their job.

Senator EXON. And you have no hesitancy of telling this committee?

Secretary ALDRIDGE. I have no hesitancy at all, for the people who are properly cleared for the information and are approved by you as the Chairman of this committee or the Senate Select Committee on Intelligence.

We are absolutely forthcoming. I had a hearing yesterday with some individuals and we were very forthcoming in telling them exactly what the space systems are. But there may be some satellites that there may be some concern about, and if there are I will come before this committee and tell you why.

Senator EXON. That seems reasonable.

I have no further questions right now. As I said, we will have some for you for the record. I appreciate very much your coming over here today and your patience in what has been a pretty well interrupted afternoon.

Thank you, Mr. Secretary, and you are excused.

Secretary ALDRIDGE. Thank you, Mr. Chairman.

Senator EXON. Mr. Myers, would you come forward now.

Mr. Dale D. Myers is the Deputy Administrator of NASA. It is indeed a pleasure to have you with us today, Mr. Myers. And I would like to take this opportunity to convey our wishes for the success of your upcoming shuttle launch, which I think you will be talking about in some more detail.

And I was glad to receive the information that as of now everything is strictly on schedule.

Mr. Myers, as you know only too well, this committee does not have jurisdiction over your agency, but yet in several areas you are deeply involved with activities that are of vital concern to this committee. Decisions you and others make, for example, on the space shuttle, the space station, and the formal joint DOD-NASA program, such as the NASP and ALS, have a direct impact on DOD's space program and therefore are of great interest to this committee.

The information that you will provide us today on these matters will help us immensely, I am sure, in managing our own affairs and making our own recommendations, as is our responsibility. We look forward to your testimony and I would ask you to proceed at this time.

And I will say that, without objection, the full text of your statement will be entered into the record as if delivered, and you can proceed with that if you want to, in any manner that you see fit. We are here to listen to you. I have a prepared statement by Sen. Thurmond for our second witness which I will insert for the record.

[The prepared statement of Senator Thurmond follows:]

Prepared Statement of Senator Strom Thurmond

Thank you, Mr. Chairman. I join you in welcoming our second witness, Mr. Myers, to the subcommittee. I am enthusiastic, as indeed he must be, that the Nation will soon have the space shuttle operating again.

I look forward to hearing his testimony, which taken together with the very frank and helpful testimony of Secretary Aldridge, will provide a strong record on which to base our recommendations during the upcoming markup.

I will have questions for Mr. Myers at the appropriate time.

Thank you, Mr. Chairman.

STATEMENT OF DALE D. MYERS, DEPUTY ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. Myers. I would like to just place my longer typewritten part into the record and just summarize where I think we are headed.

Senator Exon. Please proceed.

Mr. Myers. Mr. Chairman, I am very pleased to be here to represent NASA and our interest in cooperation with the Air Force. We have had a long and beneficial relationship with the Defense Department over many, many years, I think clear back to the early days of NACA and the early aeronautical research in supporting the DOD interests.

NASA has put top priority on returning the shuttle to safe flight since the Challenger tragedy. We are on schedule for an August launch, after 2½ years of redesign and requalification of the program, involving many changes. Dick Truly, who is the Associate Administrator of the Office of Space Flight, had what we call a design certification review yesterday and told me this morning that it was a very successful review of all of the changes that have been made, the progress and the testing, the vehicles under test now down at the Cape. And we look for a successful launch in August.

Now, the flight rate on the shuttle as it builds up is planned to go to 14 flights per year. We had planned previous to the Challenger accident to go to 24 flights per year. That is a decrement of 10 flights per year that is involved with a very capable performance of the shuttle. That is part of the problem that Secretary Aldridge was talking about today.

There has been a major reduction in the flight planning for the shuttle. There was a cancellation of the carrying of the Centaur on the shuttle, and that caused another problem for the Air Force because they then had to get another vehicle to carry some of their very heavy payloads to higher orbits than low earth orbit.

And in the process of the redesign of the shuttle, some of our conservativeness that went into the operation of the main engines and the changes to the solid rocket boosters that are carried on the shuttle, we reduced the throw weight, in other words the capability to carry payload into orbit.

So a few of the DOD payloads were eliminated as to their capability on the shuttle. I think that combination is really the essence, plus of course the 2½-year delay, of the difficulties that the Air Force has had and are a pure reflection of the kind of tremendous difficulties that NASA has had with their science community.

Just today, in fact, I think at exactly this time today, we are launching the first scientific payload that NASA has launched since the shuttle accident. It is a chilling thought to the science community that we have not been able to launch any of the payloads that had been authorized and had been built and had been stored for all this time. So there is a tremendous need to re-establish a robust launch capability in this country.

I think the Air Force is doing the best they can in bringing on the vehicles that will serve their needs for the defense of the country. And NASA in fact is bringing in what we call a mixed fleet also, because even with the offloading of the Air Force, the remaining requirements for the shuttle oversubscribe the shuttle.

And we are in fact bringing in a few expendable launch vehicles to support our scientific payloads and our commercial activities. And by the way, our commercial activities are in the nature of material processing and activities that may lead to manufacturing in space and those kind of commercial type ventures are carried by the shuttle.

The Space Station is in a very critical position this year. The NASA budget has increased quite strongly this year, the request from the President, and the reason for that is that we are reaching for, rather than 1 launch in calendar year 1988, we are reaching for 7 launches in 1989, and 10 launches in 1990.

So this buildup of launch rate is requiring a buildup of the shuttle funding requirements, and is part of the increase in the budget that NASA is requiring.

The Space Station is just getting under way and we will be utilizing the shuttle in the 1995–96 time period. Space Station is expected to use 8 of the 14 launches during one of the years of assembly of the Space Station in that time period.

Our steady state requirements for the shuttle in that time period is 5 per year. So out of the 14 launches available, five per year would be used for the Space Station.

In our working with the DOD, we have done a very considerable amount of work in meeting the priorities of the Air Force in what we call manifesting of the shuttle. We have a heavy manifesting in the early period while they are waiting for the buildup of the Titan launch rate capacity.

And we then over a period of time drop down to about two flights per year with the Air Force, and that matches very well the beginning of the Space Station activity and I think tends to balance out in those 14 flights per year in the planning that we have.

The construction of the replacement space shuttle orbiter is about 20 to 25 percent complete and the production is on schedule. The building process for the vehicle was expedited by using existing structural spares, enabling planned delivery to the Kennedy Space Center in Florida in May of 1991.

I have discussed the items that caused the difficulties with the shuttle and the requirements for an increase in Titan launch vehicles for the Air Force. And I think I can skip down to the bottom of this page.

One of the things that I mentioned was a decrease in the capability of the shuttle. We have lost over 10,000 pounds of capability in the shuttle since it was first designed. We have now under way in this year the beginning of an Advanced Solid Rocket Motor, which will bring the shuttle back up to the original performance capacity by about 1994. And that will be a 65,000 pound payload capacity due east at 110 nautical miles.

That is a powerful capability, one that really does match many of the DOD special heavy payloads in that time period.

One thing we have done in the remanifesting, we have been able to accommodate some DOD payloads that had not yet been assigned to flight. We were able to recombine the Teal Ruby and Cirris spacecraft on an early flight, flight 37 in February of 1990.

This had been the combination assigned to the first shuttle flight at Vandenberg. We will now be launching that out of the east coast. We added the IBSS experiment to the flight and are currently assessing the details of that total combination.

The NASA mixed flight manifest just published, nine dedicated DOD shuttle flights are scheduled through fiscal year 1991 and two dedicated DOD flights per year projected for fiscal year 1992 and subsequent years.

The near term strategy for providing expendable launch vehicle support to the DOD is essentially as it was prior to the Challenger. Beyond the existing ELV schedule and as NASA develops the mixed fleet policy, ELV launch services will be purchased from the private sector and for Titan IV class payloads with the DOD.

As Secretary Aldridge has noted, NASA is launching today the first science payload that we have had since the Challenger accident. Now, problems can always be expected to occur. Some periods of standdown will probably interrupt this schedule.

Even if standdown periods are sharply reduced from those experienced in the past, there still could be little excess launch capacity to assure access to space for the civil and military sectors. I think Secretary Aldridge and I both agree that we have a very tight launch capacity in this country.

It is not robust. It does not have margin in it.

Turning now to other efforts which will help ensure reliable access to space in the years to come, NASA is participating enthusiastically in the Advanced Launch System development program or the ALS.

The test site for the liquid rocket engine testing has been agreed to and the agreements have been reached with NASA relative to liquid engine systems activities by NASA for the ALS program, and NASA is responsible for the focused technology program management. It is a mixed development between ourselves and the DOD and has been a very active and successful recognition and identification of the technologies that are needed for this next launch system called the ALS.

Propulsion-related development efforts will constitute approximately 60 percent of the currently planned fiscal year 1987 to fiscal year 1992 ALS focused technology program. NASA will fund the unique civil requirements of the program. In other words the things associated with manned space flight we will be funding. Otherwise, it will be an Air Force funded program.

As part of the ALS concept and the system definition study efforts, NASA initiated a Shuttle C study focusing on maximum utilization of shuttle hardware. In this case we are using the tanks directly from the shuttle program, the solid rocket boosters directly from the shuttle program, and the main engines, the high pressure main engines, hydrogen-oxygen engines from the shuttle program.

We bring the thrust from those main engines into a structure that then supports a fairing over the payload and brings into being a development program, which should be a minimum development program, that can generate a very high reliability device in a very short time.

That Shuttle C concept for unmanned heavy lift capability, that would use the shuttle's propulsion hardware but provide the greatly increased cargo capacity by replacing the current manned orbiter with an expendable payload shroud.

As part of the national launch vehicle planning effort, NASA believes the Shuttle C study contributes substantially to the overall understanding of launch vehicle options for the early nineties.

NASA and DOD are participating in a joint program designated National Aero-Space Plane or NASP program. The objective is to develop the technologies for a new class of military and civilian aerospace vehicles that incorporates a research vehicle, the X-30, which will evaluate these technologies in flight.

The X-30 will not be an operational vehicle. It will not even be a prototype for an operational vehicle. It will be a test bed that will eventually develop the technologies that can usher in an incredibly powerful capability for this country and ensure U.S. leadership in aerospace.

Mr. Chairman, that concludes my statement. I would be very pleased to answer any questions you have.

[The prepared statement of Mr. Myers follows:]

Statement of

Dale D. Myers
Deputy Administrator

National Aeronautics and Space Administration

Mr. Chairman and Distinguished Members of the Subcommittee:

I am pleased to appear before you today to discuss NASA support for DOD requirements pertaining to space access and transportation. As you know, we have enjoyed a long and mutually beneficial relationship with the DOD which has significantly enhanced this nation's scientific prosperity. Working relationships and formal agreements are in place to insure this cooperation continues to be productive, and indeed promise even greater accomplishments in the future. I will summarize a number of cooperative endeavors for you today. Among these, the most recent and potentially rewarding is the joint DOD/NASA Advanced Launch System (ALS) development program.

President Reagan signed a report to Congress on January 5, 1988, creating the joint program. The report established a program office headed by an Air Force manager and a NASA deputy manager. H.J. Resolution 395 required DOD and NASA to develop agreements on ALS responsibilities and commitments. With this accomplished, the Senate Committee on Appropriations on March 10, 1988, authorized DOD to proceed with the use of funds.

NASA is particularly enthusiastic about its role in ALS. The test site for ALS liquid rocket engine development will be the NASA-managed National Space Technology Laboratories, Mississippi. While the DOD will fund the direct ALS program, including facilities and equipment necessary for research, development and operations, NASA will fund unique civil requirements. NASA participated as a partner in the planning of the ALS focused technology program, for which we have management responsibility. Oversight to this program was provided to assure coordination of the ALS focused technology efforts with the generic technology efforts of the Civil Space Technology Initiative (CSTI). CSTI is providing a generic base of design and analysis tools which ALS will utilize for focused hardware demonstrations. NASA will also have management responsibility for all ALS liquid engine systems activities.

Propulsion-related development efforts will constitute approximately 60 percent of the currently planned FY 1987 to FY 1992 ALS focused technology program. Ninety-four million dollars of FY 1987/FY 1988 technology funds will be applied directly to propulsion efforts, along with $14 million in propulsion-related efforts. Consistent with the President's ALS plan, NASA will manage the ALS focused technology efforts.

As part of the ALS concept and the system definition study efforts, NASA initiated Shuttle-C studies focusing on maximum utilization of Shuttle hardware, facilities, and operations. Shuttle-C is a concept for unmanned heavy lift capability that would use the Shuttle propulsion hardware but provide for greatly increased cargo capacity in place of the current manned orbiter. As part of the national launch vehicle planning effort, NASA believes that Shuttle-C studies contribute substantially to the overall understanding of launch vehicle options.

NASA and the Department of Defense are participating in a joint program designated the National Aero-Space Plane (NASP) Program. The objective is to develop the technologies for a new class of military and civilian aerospace vehicles. The new vehicles are to have airbreathing propulsion systems and be capable of taking off from conventional runways, entering low earth orbit, and returning. The program incorporates a research vehicle, the X-30, which will evaluate these technologies in flight. The NASP program represents a national resurgence in hypersonic research and technology (R&T) activities and is a program that is responsive to the national aeronautical goal in transatmospherics.

The NASP program has renewed and revitalized hypersonic research and technology activities in NASA and military laboratories, in industry, and in university programs. Our request for FY 1989 funds includes $84.4 million for transatmospheric R&T. These funds, along with direct R&T base support, provide NASA funding of $103.8 million to the NASP program in FY 1989. In addition, when both the NASA and DOD indirect support, in terms of technical staff and facilities operations, is included in the calculation, NASA's share is 42 percent of the FY 1989 funding. NASA facility contributions are extensive and sometimes overlooked in analyses of agency participation in major programs. The array of wind tunnels, unique test facilities, and large computations capabilities make very significant contributions to these programs. For example, in the area of computational fluid dynamics, NASA has committed time on the powerful class VI computers at each of the research centers to support NASP analyses and design activities. NASP program demand has ranged from 20 percent to 50 percent of the available Numeric Aerodynamics Simulator (NAS) capability over these first two years of the program. The sophisticated numerical simulations required for the NASP Phase 2 program would not have been possible without the technological advances resulting from the NASA computational fluid dynamics and NAS programs.

As can be seen, NASA cooperates readily with DOD on some highly significant programs. The NASP is not an operational vehicle. It is not even a prototype for an operational vehicle. It is a test bed that will develop technologies that can usher in an incredibly powerful capability for the country and ensure U.S. leadership in aerospace when this capability is vital to either national security or economic competitiveness.

Construction of a replacement orbiter is presently 20 to 25 percent complete. On August 1, 1987, a contract was signed with Rockwell International for construction of the replacement orbiter, using the OV-104 (Atlantis) configuration as baseline with updates to current-fleet configuration. The building process for the vehicle was expedited by using existing structural spares, thereby permitting planned delivery to Kennedy Space Center, Florida, in May 1991. Production is on schedule. Of the $2.1 billion appropriated in FY 1987 for the replacement orbiter, subsequent action in the FY 1988 appropriations process transferred $100 million to Space Station, and authorized the transfer of up to $125 million for recovery actions in the Space Shuttle program. The Congressional reductions present a management challenge in as much as previous vehicles have experienced cost increases during construction. Changes in each vehicle are booked against that vehicle for its projected useful life span. Structural element subcontractors are delivering final parts. They are required to retain some production capability through FY 1988 to accommodate delivery of a new set of structural spares included in the FY 1989 budget.

The near-term strategy for providing Expendable Launch Vehicle (ELV) support to the DOD is essentially as existed pre-Challenger. A Scout launch capability has been retained to launch U.S. Navy payloads in April and August 1988, and February and August 1990. A DOD payload will be carried aboard a Delta booster in August 1988, and a FLTSATCOM is scheduled aboard an Atlas-Centaur in September 1989. NASA also receives launch services from the DOD. Two Delta IIs and one Titan IV will be provided in support of NASA programs. The Delta IIs are for the Roentgen Satellite (ROSAT) and Extreme Ultraviolet Explorer (EUVE) payloads to be launched respectively in February 1990 and August 1991. A Titan IV is planned as a backup for one of the three planetary missions now scheduled on the Space Shuttle in 1991. Additionally, NASA acts as agent for the National Oceanic and Atmospheric Administration (NOAA) in procuring launch services from the Air Force. Three remaining Atlas E boosters will be employed for the NOAA H, I, and J spacecraft. With the Atlas inventory depleted, the program will use the Titan II. Beyond this schedule, as NASA develops the mixed fleet policy ELV launch services will be purchased from the private sector and, for Titan IV class payloads, with the DOD.

Prior to the Challenger accident and the subsequent standdown, the DOD was heavily manifested on the Space Shuttle. Six to seven flights per year were projected for KSC and three to four flights per year projected for VLS. These Shuttle launches were augmented in the DOD plan by ten Titan IV launches at the Eastern Space and Missile Center through FY 1993. The STS standdown and reduced flight rates, together with the Titan 34D standdown, resulted in the need for DOD to further augment the Titan IV launch capacity in order to maintain assured access to space for critical national security payloads.

In the NASA Mixed Fleet Manifest just published, nine dedicated DOD Shuttle flights are scheduled through FY 1991 and two dedicated DOD flights per year projected for FY 1992 and subsequent years. In addition to these dedicated DOD payloads, two Global Positioning System (GPS) satellites remain on the STS manifest on shared flights in FY 1991 and the remaining GPS satellite has been moved to the Delta II launch vehicle. The DOD fully coordinated its STS offloading with NASA. Moreover, we worked together to develop the manifest for the national mixed fleet, accounting for all planned STS and ELV payload assignments projected through the mid-1990s.

Other factors have caused DOD to offload to the Titan IV booster. One was cancellation of the STS/Centaur program. DOD payloads which had planned to use the high-performance Centaur upper stage found performance and on-orbit lifetime penalties associated with using the IUS in its place. Several DOD programs were therefore forced to move to the Titan IV/Centaur combination in order to retain the higher performance upper stage.

Another factor was the change in the generic performance capability of the Space Shuttle following STS 51-L. The Solid Rocket Booster redesign, modifications to the orbiters, and a reduction of main engine power levels, combined to reduce the STS payload delivery capability to low earth orbit by 12,000 pounds. This reduction will be fully offset and the STS restored to full payload delivery capability by the mid-1990s with utility of the Advanced Solid Rocket Motor (ASRM), which is expected to provide a 12,000-pound increase in payload delivery capability.

Following Challenger, NASA developed a plan for safe return to flight for the Space Shuttle fleet. As part of this activity, a series of manifest iterations were developed. Throughout this remanifesting process, the DOD national security payloads were given highest priority among all STS payloads. As such, they were scheduled as early as was feasible and were assigned only to the high-performance orbiters. NASA conducted scheduling of DOD payloads with the full coordination of all interested offices in the DOD and the Air Force; with the Secretary of the Air Force; and with the periodic formal review of the Secretary's Launch Advisory Group which has representation from all STS users in the DOD payload community.

Problems can always be expected to occur and some periods of standdown will probably interrupt this success-oriented schedule. Even if standdown periods are sharply reduced from those that both NASA and the DOD have experienced in the past, there still could be little excess launch capacity to assure access to space for the civil and military sectors.

Mr. Chairman, this concludes my formal testimony. I shall be glad to answer any questions you may have.

Senator EXON. Mr. Myers, thank you very much. And as I said earlier, we have accepted your whole statement for the record, and we appreciate very much your coming here today to enlighten us on some of these things.

On a personal note, I was coming back from Miami Monday morning early and we were diverted west of the normal traffic pattern because of a missile shot. We saw the shot go off the right wing. What was that shot that went off Monday morning?

General MOORMAN. Mr. Chairman, not only do we do space launches from that test center, we also do missile launches as well. And although I am not sure, I think that may have been a Pershing launch. I will check.

Senator EXON. I was just curious as to what it was. It looked like it was a small rocket.

Mr. MYERS. Unfortunately, our launches down there have been at a standstill for many months.

Senator EXON. Well, it is good to see activity.

Mr. MYERS. Yes, it is.

Well, this launch today is called a Scout vehicle. It is the smallest launch vehicle that will go into orbit that we have. The payload is 550 pounds. It is a very exciting payload. It is of meteorological benefit in terms of research.

But it is the first of our scientific payloads since the Challenger accident.

Senator EXON. That went off today?

Mr. MYERS. Well, it is scheduled at this moment, and I have not heard. I have not had a report on how it went. It is being launched, by the way, at the San Marcos launch platform at the equator off of Kenya on an Italian launch platform, with a mixed payload of American, Italian, and I believe it is British experiments.

NON-DEFENSE DISCRETIONARY SPENDING INCREASES

Senator EXON. Mr. Myers, if I am not mistaken, last year's budget summit allowed $3 billion in outlays to cover all non-defense discretionary spending increases.

From what I have seen, NASA's budget request will absorb about two-thirds of that, about $1.8 billion, which is about 60 percent. Do you really believe that you are likely to get that much? Is that what has been committed to you?

And if you do not obtain that level of funding, would you agree that one of the victims might possibly be the Space Station schedule?

Mr. Myers. Mr. Chairman, the budget that we have requested we feel is absolutely vital to the future leadership of the United States in space. President Reagan on February 11 established a new space policy that calls out the Space Station as one of the key elements of this space policy.

We think it is fundamentally important to the future interests and leadership of the United States, and we believe that it is extremely important that the Congress understand how important this budget is to the future leadership of the civil space program.

We do not know how all of this will come out. We think that the technology associated with that element of the budget is an absolutely key technology to the future of technology transfer to industry and in the kinds of things that attract young people into the engineering profession, which I think is vital to the future of this country from a competitiveness standpoint.

And cutting the NASA budget this year, of all the years that we have had, is the one that I think would have the most devastating effect on the future of this country in technology.

I do not know enough about how the budgets work to say whether the $1.8 billion is that part that we must have. But I believe that budget and the earliest Space Station we can get is absolutely key to the country.

Senator Exon. I think we agree with you. And of course, the basic thrust of the question was to try to tie down where we are on this budget.

I guess what I am trying to do is to be able to make an argument for the funding level that you have outlined. I have just assumed—and maybe I assume incorrectly—that if you did not reach that funding level, the most likely victim unfortunately would be the further delay of the Space Station schedule.

And if you do not care to comment on that——

Mr. Myers. No, I would like to comment on it. You have hit the nail right on the head. In response to the position I am in here today, I should also point out that we believe the shuttle schedule is vital and a top priority for NASA and for the Nation, because of its importance to the military support that we have here.

These early flights that we have are vital national issue flights, and we are going to support the budget and the schedule of the shuttle. Now, beyond that, because that takes a buildup in budget in NASA to support the budget that goes with the schedule of the shuttle. Then the addition is the part that lays the groundwork for the whole future strategy of where this country is going in space.

The Space Station does scientific activities, it does astrophysics, it does meteorological work, it does the initial work in this country for understanding man's capability of operating for long times in space. It becomes the place where we service and launch and recover upper stages that transfer to the upper planets. It is so vital to everything we are doing in the future that it just in my mind must be supported.

I do not see how the country can do anything but slide into second place in the eyes of the world and in the eyes of our people if we do not support the Space Station strongly.

Senator EXON. Well, Mr. Myers, as a member of the Armed Services Committee and also a member of the Commerce Committee, I have always been a strong supporter of these programs, and I have used the arguments that you just used over and over again, because this has intrinsic value even over and above what we are trying to do.

SHUTTLE FLIGHTS

But let me go into that a little bit further. And maybe you are not in a position to answer this question, but I am going to ask it because I think that we need some clarification, from whatever sources we can get. Our committee staff on Armed Services are in discussion with Commerce Committee staff right now, and the Commerce Committee staff claims there will be shuttle flights available even if the Space Station slips, even if the shuttle flight rate is only about 10 per year rather than the 12 to 16 or 17 as you have outlined here today.

Do you take issue with that assertion, and if so why?

Mr. MYERS. Mr. Chairman, we have a tremendous backlog of payloads, and we have done the best we can to put the priority payloads into the program. There is a new issue that is developing in this commercialization of space.

We see interest on the part of industry to build, own, and operate devices in space that can be used for manufacturing in space. And it is kind of an interesting thing that, if there is a priority military payload it will take priority. If there is an offloading of the military payloads down to say the two per year that we are planning out in that time period, we have other payloads that need to go on the shuttle.

We will always be trading and working priorities for the payloads on the shuttle. And we have not seen any openings, let us say, on the shuttle in that time period.

Senator EXON. One last question, Mr. Myers. And I want to preface this question with what is assumed up here, whether it is right or wrong, and it is assumed basically because of the vast expenditures we authorize up here for a whole series of very important programs, many of them black programs.

NASP PROGRAM COSTS

But it has been the impression over the years that when we get on all of these programs—and I would throw SDI into that category, a very expensive program that we get very excited about from time to time, as we do with your program—there is a basic assumption that the funding levels are always higher than they should be and maybe the control of costs are not as tight as they should be that we expect from all programs today, given the budget constraints.

But with respect to NASP cost accounting, there are those who are inclined to accept that at face value, the so-called indirect costs. And that is a matter of concern and discussion, probably more than you realize. I think you would be well advised to provide the committee with a detailed accounting, if you can, and the rationale for indirect costs which you are claiming as part of your contribution to the NASP program.

Has DOD approved the cost accounting formula, and has it been formally conveyed to Congress in order to lift the restrictions on the NASP program?

Mr. **Myers**. Mr. Chairman, as far as I know those what you call indirect costs have been accepted by DOD. What they boil down to is our people in our laboratories, our scientists in the laboratories, and I do not really think of that as indirect costs in the terms of overhead.

These are people who are actually running the wind tunnels, doing the computational work, using our Class 6 computers. There is a tremendous number of civil service people that we employ in support of the NASP program.

One of the exciting things about the NASP is it has sort of recharged the batteries of some of our really advanced thinking scientists, and I think it has been an especially important program for bringing new young people into NASA.

But they are not overhead. They are not the people that you think of as the general managers or the people of that nature. They are the working innovative scientists that are supporting that program.

But we will certainly get you information concerning that.

Senator **Exon**. I think that would be a very good idea. And there may be some other questions that members wish to submit to you for the record, and we would appreciate your returning those as promptly as you can if there are any further questions, Mr. Myers.

[The information follows:]

The total direct cost estimate for the NASP program is approximately $3.3 billion and was made at the beginning of the program. This direct cost estimate includes the current technology development phase, which is scheduled to be completed in the fall of 1990, and the design, construction, and flight test of the X-30 research vehicle, which could begin in 1991, with a first flight in about 1995.

This estimated level of funding is to cover total program costs of Phases I, II, and III of the NASP program. The first phase was a concept development phase and has been completed, and we are in the middle of the technology development phase (Phase II). At the completion of this phase in the fall of 1990, the DOD and NASA will decide whether to proceed with the third phase, the construction and flight test of the X-30. Inputs to the decision to proceed with the third phase include a more accurate Phase III cost estimate from the government and industry teams. Plans for Phase III include construction of two flight vehicles and a partial vehicle for ground testing.

The total costs, direct and institutional support, for NASA and DOD, by year, are shown in the attached chart. The direct funds are those appropriated by the Congress for the NASP program. For the DOD, this institutional support consists of the assignment of military personnel, and the provision of indirect installation and civilian personnel support. For NASA, this institutional support consists of the assignment of civil service technical and support personnel and the operation and related maintenance of NASA facilities.

The end of the NASP program is the completion of the flight research activity in the late-1990s. From an assessment of that technology base, for both earth orbital and hypersonic cruise vehicle applications, decisions would be made whether to proceed with prototype or operational vehicles.

NASP RESOURCES SUMMARY
(1986 -1994)
($, M)

Fiscal Year	1986	1987	1988	1989	1990-1992	To Complete
NASP DIRECT						
NASA	16	62	70	104	331	83
DOD	45	110	183	245	1395	555
(Subtotal)	(61)	(172)	(253)	(349)	(1726)	(638)
EST. INST. SUPPORT						
NASA	30	70	80	84	214	90
DOD	--	11	11	11	33	22
(Subtotal)	(30)	(81)	(91)	(95)	(247)	(112)
TOTAL	91	253	344	444	1973	750
(Total NASA)	(46)	(132)	(150)	(188)	(545)	(173)
(Total DOD)	(45)	(121)	(194)	(256)	(1428)	(577)

Senator EXON. With that, I thank you once again for coming here today. Your testimony has been very helpful to us.

And with that, the subcommittee is adjourned.

[Questions for the hearing record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

TITAN IV PAD COSTING

Senator EXON. Secretary Aldridge, how much will the second Titan IV pad at Vandenberg cost? In what fiscal year will you initiate funding profile? What is the launch capacity of the existing Titan IV pad? Of the proposed pad?

Secretary ALDRIDGE. $565 million is budgeted for a second Titan IV pad at Vandenberg, to include a Centaur upper stage capability. The contract will be competitively bid. The funding profile is based on fiscal year 1988 start and supports a fiscal year 1995 launch requirement. Funding profile is as follows:

Profiles

Fiscal year:	
1988	$25,000,000
1989	25,000,000
1990	80,000,000
1991	150,000,000
1992	200,000,000
1993	70,000,000
1994	15,000,000
Total	565,000,000

The existing Titan 34D launch pad at Vandenberg is Space Launch Complex Four East (SLC-4E). This pad will support one more Titan 34D launch and then will be down for 15 months for conversion to a Titan IV configuration. Launch capacity of the converted SLC-4E will be three launches per year. The new Titan IV pad planned at Vandenberg would be Space Launch Complex Seven (SLC-7) and would support the Titan IV/Centaur configuration and be capable of three launches per year providing a maximum launch capability of six per year in fiscal year 1995.

TITAN IV PAD SCHEDULE

Senator EXON. In what fiscal year do you plan to exceed the launch capacity of the existing Titan IV pad at Vandenberg? What fiscal year do you plan to complete the second pad. If necessary, could you complete the second pad sooner?

Secretary ALDRIDGE. The capacity of Space Launch Complex-4E (SLC-4E), the existing Titan pad, is three launches per year for the Titan 34D vehicle. Upon the launch of the one remaining Titan 34D vehicle the pad will be down for 14 months for conversion to a Titan IV capability. The converted Titan IV launch rate will be three per year, the same as before.

DOD launch requirements will exceed three per year in FY95 and will require a new Titan IV launch pad (SLC-7) with an initial launch capability (ILC) in fiscal year 1995 and a launch capacity of three per year.

If required, the ILC could be advanced. The Air Force has not examined an earlier capability. Advancing the completion date normally increases cost and/or risk that is not presently warranted.

VANDENBERG SHUTTLE PAD

Senator EXON. It is my understanding that you need to preserve the Vandenberg shuttle pad in case SDIO decides it needs a man in space as part of its Phase I deployment and so that NASA could fly its two planned polar platforms. Both missions are contingent on NASA getting the shuttle's payload back up, through the advanced solid rocket development. We won't know whether there will even be a Phase I SDI until the mid-90s, and the polar-orbiters and space station have already effectively slipped until the latter 1990s, haven't they? How do you justify the Air Force spending $50 million every year to keep that pad open?

Secretary ALDRIDGE. Currently, with the present Shuttle reduced payload capability, there are no Shuttle launch requirements at Vandenberg for the AF, SDIO, or NASA (NASA should be queried on their future polar space station requirements). For that reason the Vandenberg Shuttle facilities were directed to Minimum Facility Caretaker (MFC) status in October 1986. The cost of MFC was $50 million per year and preserved the option to reactivate the site within 4 years. During MFC, alternate users were allowed to use Vandenberg Shuttle facilities and equipment as long as they agreed to return them in original configuration when required. The $50 million maintained these facilities and alternate users used them at no additional expense as long as the cost did not exceed the MFC cost for the facility. Use and operational costs above MFC were provided by the user. Alternate users consisted of the following: Ground Launched Cruise Missile Program, Atlas Space Launch Program, Titan 34D Space Launch Program, NASA External Tank and Solid Rocket Motor Program, DOD Satellite Programs.

MFC provided time to allow for the Air Force to finish Space Launch Recovery Planning. It maintained a west coast Shuttle option until plans for expendable vehicles were complete and an initial Advanced Launch System architecture was developed.

In December 1987, Congress reduced the Fiscal Year 1988 MFC budget to $40 million, told the Air Force not to expect that funding level in the future, directed the transfer of as many facilities as possible to alternate users, and told the Air Force to mothball the rest. Execution of this direction is in progress and will significantly reduce direct Vandenberg Shuttle costs due to facility transfer and mothballing.

This action will greatly impact the ability to reactivate the site in the future due to facility deterioration and configuration changes that alternate users will make once they control the facilities. A final report will be provided to Congress in June 1988 to detail AF actions taken to mothball Vandenberg Shuttle facilities.

VANDENBERG SHUTTLE PAD FUNDING

Senator EXON. Who would pay the $500 M needed to bring the Vandenberg Shuttle pad back to life?

Secretary ALDRIDGE. The Air Force plan to fund the Vandenburg Shuttle facilities at $50 million per year while in Minimum Facility Caretaker status preserved the option to reactivate in about 4 years.

Once congressionally-directed mothball and transfer of these facilities is complete, the ability to recover and/or reactivate the Vandenberg facilities will increase with time in both cost and risk. Funding to reactivate a Shuttle capability at Vandenberg could be provided by the agencies with the satellite programs or missions that require the capability. If the missions were DOD only or a DOD/NASA mix, reactivation would be managed by the AF Space Boosters Program and be funded by the appropriate DOD and other government agencies. If NASA was the sole user, facilities could be transferred to NASA for reactivation funding and operational costs.

VANDENBERG SHUTTLE PAD USES

Senator EXON. If it is not reasonable to modify the shuttle pad for Titan IV launch, would it be a good candidate for ALS?

Secretary ALDRIDGE. The need exists for a second Titan IV pad on the west coast. Currently only one Space Launch Complex (SLC-4E) is planned to handle the Titan IV from Vandenberg AFB. The reason a second pad is required is that SLC-4E cannot handle a Titan IV with a Centaur upper stage and the launch rate required in 1995 is greater than the capabilities of one pad. Additionally, a second pad would provide assured access for critical national security.

SLC-6 could be modified to allow Titan IV use, but this would eliminate any capability of a west coast (polar orbit) Shuttle launch. If SLC-6 were modified for Titan IV in such a manner as to allow an eventual return to a Shuttle configuration, Shuttle reactivation would result in a single Titan IV launch pad being available with no Centaur capability on the west coast. From the stand point of size and location, SLC-6 would be a good candidate for ALS. Whether it would be a cost effective option is currently being examined during ALS concept definition. The same constraints regarding future Shuttle use would have to be addressed for ALS.

VANDENBERG SHUTTLE PAD MODIFICATION

Senator EXON. How much would it cost to modify the existing Shuttle pad for Titan IV launch?

Secretary ALDRIDGE. The modification of Space Launch Complex-6, the Vandenberg Shuttle Pad, to the Titan IV/Centaur Configuration would cost $441 million based on a fiscal year 1990 start with an Initial Launch Capability of October 1994. This modification would preclude launching the Shuttle from SLC-6 without significant "re-conversion" costs. Breakout by appropriations is as follows: 3020 (Missile Procurement): $197 million; 3080 (Other Procurement): $33 million; 3600 (Research and Development): $211 million.

TITAN IV PRODUCTION CAPACITY

Senator EXON. You have a requirement for 45 Titan IV boosters between fiscal year 1989 and fiscal year 1995. Your current production capacity is claimed to be six or so per year. The only year you really exceed your production capacity is fiscal year 1995. Why are you initiating capacity expansion in 1988 if it is not needed until fiscal year 1995? Does it take 8 years to achieve that increase?

Secretary ALDRIDGE. The current production capacity is six Titan IV vehicles per year. The current launch manifest exceeds this capacity in fiscal year 1991, fiscal year 1994 and fiscal year 1995. Planning data also shows this rate being exceeded in fiscal year 1996 and subsequent years. Because the rate is exceeded in fiscal year 1991, our expansion begins in fiscal year 1988 and fiscal year 1989.

TITAN IV BOOSTER PRODUCTION LIMITATIONS

Senator EXON. You claim the production capacity of Titan IVs is only six per year. The contractor, Martin Marietta, has indicated to OTA that it is significantly higher. What are the specific bottlenecks limiting you to six per year, and who are the contractors for each? What are the costs to remove each bottleneck, and what is the funding profile for costs to remove each?

Secretary ALDRIDGE. The limitations on Titan IV capacity to meet our requirements are in payload fairing and solid rocket motor (SRM) production. McDonnell-Douglas is the payload fairing contractor and UTC Chemical Systems Division is the SRM contractor. The cost to acquire additional fairing capacity (increased to 10/yr) is $22 million distributed equally in 1988 and 1989. The SRM upgrade project costs are $16 million in 1988 with additional requirements of $16 million, $198 million, $106 million, and $35 million in 1989-1992. The SRM upgrade contractor is Hercules Aerospace Co. and will have a 10 set/yr capability.

SHIFTING TITAN IV PAYLOADS TO THE SHUTTLE

Senator EXON. NASA currently plans a minimum of 17 Shuttle flights for the space station between fiscal year 1993 and fiscal year 1995, and possibly as many as 24. It seems clear that the space station will be delayed for lack of funds. If it slips just 2 years, a minimum of 13, and possibly as many as 19, shuttle flights will become available. Why can't DOD buy fewer Titans and dispense with the MLV-II by flying Titan IV payloads on the Shuttle and by launching two DSCS at a time from the Shuttle? If the answer is in part that we don't know yet whether the station will be delayed, we will know the answer to that within 6 months, won't we? Why can't we delay a decision on both the full Titan buy and the increased production capacity until the fiscal year 1990 budget? If the answer is in part that, even if the station slips, NASA needs all those Shuttle flights for its own program—as proved by the fact that it is being forced to buy tens of ELVs itself, why can't you buy each year at your stated Titan IV production capacity of six through fiscal year 1995? That would give you 42 of the 45 Titans you say you need. Surely you could get three more Shuttle flights from NASA if the space station schedule slips even a little bit?

Secretary ALDRIDGE. With the support of Congress the Air Force is developing a mix of ELVs to handle a wide variety of payloads and to help ensure an assured access to space. It would not be economically prudent to remove payloads from Titan IV and place them on the shuttle. It is more expensive to do so and in case of DSCS also reduces on-orbit life of the satellite due to inadequate orbit capabilities of the shuttle. The space station is carried on the NASA STS manifest for launch beginning in 1995. Critical DOD payloads must be integrated on ELVs and launched well before that time to meet priority national security missions. DSP, DSCS and Milstar must all launch before 1993 or suffer unacceptable impacts to the mission. Therefore, Space Station delays do not play in the need to procure MLV II or Titan IV for these missions through 1994. Because it takes 4 years to produce a booster (Titan IV), we must start manufacturing them in 1991 if they are scheduled to launch in 1995. Additional production capacity must be in place by the end of 1990 to meet the launch needs of 1994 and 1995. It takes 2 years to put this additional capacity in place, requiring a decision to proceed in late 1988. If the production capacity is in place, contractual options could be put in place for the last three-to-five Titan IVs planned at the end of this buy. This would give us latitude to make a decision as late as 1991 on these last several vehicles. However, for this option to be viable, we must proceed with providing the production and launch capacity necessary if the Titans are needed. We must not forget that Shuttle has not resumed operations. Already we have seen large decreases in both flight rate and payload delivery capability.

VANDENBERG SECOND PAD JUSTIFICATION

Senator EXON. In your statement you justify the request for a second pad at Vandenberg with the argument that in the event of a booster failure that wiped out the pad, you could recover the booster faster than you could rebuild the pad. The average downtime for a booster has been on the order of a year or more; could any booster failure knock a pad out that long? What was our experience with the Titan 34D failure?

Secretary ALDRIDGE. Another Titan IV pad at Vandenberg is needed for launch capacity as well as resiliency. In the former, we cannot meet critical west coast requirements on the DOD mission model in 1995 without SLC-7. In the latter, a second Titan IV pad at Vandenberg provides a backup to prevent a launch or other type disaster from totally eliminating our critical west coast polar launch capability. The downtime from an accident is dependent on the amount of damage sustained by the launch pad or the difficulty in identifying and correcting the cause for a launch vehicle failure.

In the case to the Titan-34D failure in April 1986, pad repair time was 7 months, but the damage to the launch pad was not as devastating as it could have been. The booster exploded at 700 ft altitude and its velocity carried most of the wreckage away from the pad. Most of the damage was due to shrapnel impacts throughout the launch site facilities, requiring propellant, gas, and electrical system repair. Structural damage was limited, but a supporting nitrogen system and an air conditioning building next to the launch pad were destroyed from burning solid rocket motor segment impacts. The critical Mobile Service Structure, its umbilical tower, and the launch services building were not hit by the large debris. If any of these structures had been destroyed, the pad recovery time would have been much, much longer. If a launch failure occurred on or before the vehicle cleared the pad, the result would be catastrophic. Pad repair/replacement time would be on the order of 2 years or more.

The Titan 34D recovery from the April 1986 accident was extremely long, 18 months, due to the requirement to repair, test, and certify all future solid rocket motor segments. New non-destructive test facilities and techniques had to be developed and each rocket segment submitted to extensive validation testing to certify for flight. New testing techniques were state-of-the-art. Their "first time" application contributed significantly to the time required for recovery. Vehicle downtime is usually much shorter as was evidenced by the August 1985 Titan 34D failure. The downtime between this failure and the next mission was 7 months, a much more realistic time frame for a launch vehicle recovery.

A second pad also protects against a major mishap at a launch pad not associated with launch. Titan launch vehicles are loaded with propellants up to a week prior to launch. An accident resulting in fire or explosion could totally wipe out critical pad structures and place the Air Force in the position of having to build a pad from scratch. Another threat that justifies a second pad is sabotage and terrorism. These threats could place the United States in a position where its national security is threatened due to loss of space assets and our ability to launch replacements.

Therefore, a second Titan IV launch pad at Vandenberg is essential to provide assured access to space, to provide facility backup, and meet required launch rates.

SHUTTLE FLIGHTS FOR SDI

Senator EXON. We understand that DOD plans to use up its nine pre-paid Shuttle flights by the end of fiscal year 1991. Thereafter, DOD has two dedicated Shuttle flights per year scheduled. How many of the pre-paid Shuttle flights are for SDIO? Has that number recently changed? How many of the following years' dedicated flights are for SDIO?

Secretary ALDRIDGE. SDIO has been allocated 1.33 of the nine Shuttle flights credits for the STARLAB and Infrared Background Signature Survey (IBSS) missions. This apportionment has not changed. In addition, SDIO has requested 2.33 flights from fiscal year 1991 to fiscal year 1995 which are not covered by the flight credits. This SDIO requirement recently changed from the nominal one dedicated mission per year.

TITAN IV PAYLOADS AND LAUNCH SCHEDULE

Senator EXON. Assuming you are right and a booster could be recovered faster than a pad, can you demonstrate that you will have a replacement booster and a replacement payload ready to launch when the booster is recovered? Could you provide specific examples for the Titan IV payloads and booster launch schedule?

Secretary ALDRIDGE. If you will remember the chart in my briefing that was labeled "projected DOD launch mission model"—it was one chart from the end—the DOD already has 24 unflown missions waiting on the ground for a launch vehicle, as a consequence of the Shuttle and Titan accidents. There will be absolutely no difficulty in having a payload ready to go anytime a booster and pad are available between now and 1992. That's how long it will take us to work off the DOD launch backlog. [Deleted.] Titan IVs will be available to support these needed launches.

The same is true for other launch vehicles and payloads. For example, the Defense Satellite Communication System (DSCS) program has seven spacecraft in storage. One pair is being readied for launch in 1989 on the last Air Force Titan 34D. The others are ready and waiting for Atlas II to come on line in fiscal year 1991. Five more satellites are in production for delivery by 1990 and will be available for launch through 1997.

The Defense Meteorological Satellite Program (DMSP) has one spacecraft in storage and five more in production. These satellites will be delivered in 1989–1991 and launched in 1990–1995. Two Atlas boosters are in storage, ready for launch processing. The first DMSP Titan II, that will be used after the Atlas' are launched, will be delivered in early fiscal year 1990.

Three Global Positioning System (GPS) spacecrafts have been delivered and are now awaiting launch in fiscal year 1989, and 25 more GPS satellites are in production for delivery and launch between fiscal year 1988 and fiscal year 1994. This program has enjoyed significant cost avoidance through a multiyear procurement. It has also provided a pipeline of GPS spacecraft to get that important mission into operation as soon as ample launch capacity is available and will provide the initial on-orbit spares and replacements as well.

I think these examples amply demonstrate that we have the spacecraft available in storage or in production to be ready ahead of—sometimes well in advance of—their launch vehicle. I think these examples also point out that we will have a replacement vehicle in the pipeline and ready should the need arise to expedite a payload and booster into place in response to a launch or on-orbit failure.

JUSTIFICATION FOR LAUNCH PADS

Senator EXON. Is your argument for extra pads on both coasts based on resiliency or is it based on capacity?

Secretary ALDRIDGE. The answer is yes to both. Two Titan IV pads are required on both coasts to protect against the impact of a launch accident similar to the Titan 34D failure in April 1986. The damage sustained from that failure impacted launch operations from both Space Launch Complex Four East (SLC-4E) and SLC-4W for 7 months. Two pads on each coast will guarantee assured access to space for

Titan IV launches from Cape Canaveral and for polar launches from Vandenberg AFB. This will provide the resiliency required for our critical space programs.

Launch capacity also drives the need for more pads. At Vandenberg, a capability of six launches a year will be required by fiscal year 1995, and is the requirement for development of Space Launch Complex Seven (SLC-7) at Vandenberg. Each Titan pad at Vandenberg will have a capacity of three launches per year. At Cape Canaveral, two Titan pads will be needed to meet the Titan IV and Titan IV Centaur DOD launch requirements beginning in 1992.

ASSESSMENT OF LAUNCH VEHICLES FOR COMMERCIAL SATELLITES

Senator **Exon**. In a NASA briefing that touches on the commercial satellite launch market, NASA concluded, first, that the Delta has a limited market because it is a little too small for the new generation of satellites. NASA also concluded that the Atlas/Centaur would need "upgrading for new-generation satellites." The Titan 34D, on the other hand, is a little too big, in NASA's view, requiring that customers "double-up," with all the problems caused. NASA then summed it all up by saying that these new commercial satellites "are not a good match with many U.S. ELVs" and that "some satellite organizations are leery of launch systems not backed by Government." Do you agree with these assessments, by and large? Do you think that the MLV II—which will be a little bigger than the Delta, more efficient than the Atlas/Centaur, a little smaller than the Titan 34D, and backed by the Government—sounds like the ideal vehicle for the commercial market? Do you think it will work out that way?

Secretary **Aldridge**. Since our primary mission deals with launching Defense payloads, the Air Force does not maintain a current expertise on the commercial satellite marketplace; however, as part of the competition recently conducted for DOD launch vehicles, we requested information on the commercial viability of the expendable launch vehicles under consideration.

Information provided by McDonnell Douglas, as part of the successful bid for the Delta II medium launch vehicle, indicates that this booster can accommodate roughly 60 percent of the projected commercial missions.

Our currently active Titan 34D program, and its commercial variant planned by Martin Marietta, appear to have excess capacity for the weights of typical commercial payloads. Titans may launch tandem satellites, involving a more complex mission; this approach is not new to the space launch business. The economics of a shared launch may be beneficial in the marketplace.

The fact that Delta, Atlas and Titan commercial launch activities are underway, with customers on contract, indicates that the domestic launch industry is indeed viable. The marketplace will determine what happens in the future. A reasonable expectation is that the "new-generation" commercial satellites will be influenced by the available launch vehicles and their respective costs.

As far as the statement that "some satellite organizations are leery of launch systems not backed by the government," this is more a reflection of the natural confidence placed in firms which have a high degree of experience in a particular field. The major benefit of government participation in the launch vehicle industry is some assurance of a continuing production line which results in a larger base when marketing commercial vehicles. In the private sector today, we see the established aerospace corporations conducting commercial launch programs as a follow-on or complement to government launch activities. There is also another facet where smaller entrepreneurial firms with competent and experienced personnel, but unproven launch records, are vying for a share of the commercial launch business. The customers will ultimately determine which launch corporations are effective by weighing performance, cost, schedule, experience and other factors important in each situation.

The MLV II was conceived to fit in a gap between the Delta II and today's Titan 34D, specifically to launch defense communications satellites that are built, awaiting launch. The competition, now underway, is a departure form the typical government procurement. In MLV II, we have incorporated many features now being offered to the commercial marketplace. These include buying launch services instead of hardware, streamlined and reduced paperwork, acceptance of contractor quality standards where appropriate, and provision for variable quantities. One other aspect in the competition is an assessment of the MLV II to enhance the U.S. launch vehicle industrial base as a factor in consideration for contract award.

MLV II should be highly competitive in the commercial market because this was part of our intent in furthering the President's policy to foster and encourage the commercial space industry without subsidization. This approach assists development of an internationally competitive capability with all the benefits in balance of trade, jobs and industrial base development, but also results in a more economical launch capability for government missions with a higher combined government/commercial production base.

NATIONAL AEROSPACE PLANE FUNDING

Senator **Exon**. We understand that the Air Force POM had only $150 million for NASP, and that OSD added about $100 million to that. Had you underfunded the program in your budget? Do you think that extra $100 million could be spent more wisely on other high priority Air Force programs?

Secretary **Aldridge**. The National Aero-Space Plane (NASP) program is our largest as well as being our premier Science and Technology program. The Air Force fully realizes the potential future benefits that would be derived from NASP technologies if the program is successful. There are many iterations in the budget formulation process within the Air Force and the Department of Defense and it is only the last number that counts. The Air Force fully supports the fiscal year 1989 President's Budget request for the NASP program.

ADVANCED LAUNCH SYSTEM (ALS) FUNDING

Senator **Exon**. You have been authorized and appropriated $255 million for the ALS but because of congressional dissatisfaction with the program you have been able to spend only $13 million of that. So you have over $200 million left right now. How do you justify a request for another $200 million this year when you have that much already available but unspent?

Secretary **Aldridge**. Of the $235 million appropriated for fiscal year 1987/88, we have expended $10 million and obligated and additional $35 million for completion of Phase I concept definition studies and program office support costs.

The technology base for space transportation systems ranges from 15 to 25 years old. Development experience has shown us the importance of demonstrated technology to full scale development decisions. The space shuttle main engine and thermal protection systems are prime examples. Independent studies by the DOD/NASA Space Transportation Architecture Study and the National Research Council recommended substantially increased investment in space transportation technology. The requested ALS technology funding is a modest increase long overdue. To provide a mature technology base for full scale development decisions for the Advanced Launch System, we need to spend the appropriated fiscal year 1987/88 and requested fiscal year 1989 funds.

The required amount not only addresses technology efforts but facilitization and phase two contractor tasks. We will be able to spend the requested funds promptly because much of the technology program is continuation and expansion of on-going work. Examples are LOX/LH2 engine; LOX/LHc engine; Solid Rocket booster work; Adaptive Guidance, Navigation & Control; Multi-path Redundant Avionics; Expert Systems; Cryogenic Tanks, Precision Recovery; Ground Operations; and Vehicle Health Monitoring. Also, test facilities require long-lead order of Special Test Equipment (high pressure tankage and plumbing).

ALS FUNDING PROFILE

Senator **Exon**. The Armed Services Committees last year capped ALS expenditures at $50 million pending receipt of a comprehensive DOD-NASA management plan for ALS. We have received a report but many critical issues, are in effect, labelled "To Be Determined." In particular, the Authorization Bill specifically required a cost estimate and the NASA and AF funding profiles. The report provided neither. When will this information be provided?

Secretary **Aldridge**. A total program cost estimate is an intended output of our Phase I concept definition contracts. Although we had expected to have preliminary information from those studies by April to provide a cost estimate to the Congress, the delay in Congressional release of fiscal year 1987 funds until March 15, 1988, delayed that estimate. The estimates should be available in June 1988. We plan to establish requirements, cost and technical baselines for the ALS program at the Defense Acquisition Board Milestone 0/1 review scheduled for this August. Until then, program cost estimates for development and production are necessarily preliminary. The report did identify NASA/DOD cost sharing. All program costs, except for any unique civil requirements yet to be identified, will be funded by the DOD.

ALS GROUND OPERATIONS

Senator Exon. The key to decreasing costs and booster launch throughout lies in streamlining ground operations as well as in booster hardware improvements. When you demonstrate ALS technology will you also do a demonstration of ground operations improvements? Otherwise, how do you convince a skeptical Congress that you will really achieve your cost goals?

Secretary Aldridge. As part of the ALS technology program we expect to spend approximately 12 percent of our technology funds on ground operations and manufacturing technology development and demonstrations. Included in these plans are demonstrations on existing systems of such ground operations improvements as paperless management, autonomous launch operations, automated on-line inspection/verification of flight hardware critical surface characteristics, autonomous connection and disconnection of umbilicals, remote cable/transducer identification, and others.

BOOSTER FAILURE AND ASSURED ACCESS

Senator Exon. You are developing a family of boosters all of which will be essentially the same in terms of the core vehicle, avionics, etc. Logically, therefore, when one booster fails the entire family would have to be grounded until you know what caused the failure. How does that give you assured access?

Secretary Aldridge. On the contrary, we are not developing a family of boosters which have the same core, avionics, engines, etc. The boosters that we will use for DOD payloads include Shuttle, Titan IV, Delta II, Titan II and Scout. Except for Titan II and Titan IV, they are all different systems. There is some commonality between Titan II and Titan IV in the core and engines, but since that family of vehicles has been used for over twenty years, the likelihood of a generic design problem in those common subsystem areas is very remote.

More important, DOD payloads will be distributed across six booster systems (including MLV II) so that if a stand down occurs on one system, we can continue launch operations uninterrupted on other available boosters.

ALS—UNIQUE CIVIL REQUIREMENTS

Senator Exon. The ALS management plan states that "unique civil requirements not addressed by the joint ALS baseline design will be funded by NASA." This begs the question: if NASA includes "unique civil requirements" in the baseline will DOD fund them? Are there unique civil requirements in the baseline design? What are they and how much will they cost?

Secretary Aldridge. A "joint ALS baseline design" by definition does not include "unique civil requirements." To date there have been no unique civil requirements identified. Should there be any identified in the future, NASA will fund them according to the terms of the management agreement.

BOOSTER PERFORMANCE ENHANCEMENTS

Senator Exon. What specifically are the performance enhancements now under way or under consideration for your approved fleet of boosters? Are the costs of each included in your revised space access request? What is the cost and schedule of each such performance enhancement, and what specific payload requires the increased performance?

Secretary Aldridge. [Deleted.]

ALS MANAGEMENT PLAN

Senator Exon. Secretary Carlucci has ordered a major DOD-wide study of space requirements, programs, and resources. This is supposed to be completed in time for the DRB's summer reviews. Also, a DAB is scheduled for the ALS in the summer. Is it accurate to assume that you are unlikely to have the ALS cost estimate and funding profile required as part of the management plan until that time? Why should Congress lift the $50 million obligation cap on the ALS program until after that DAB review and until we have seen the required cost and funding profiles?

Secretary Aldridge. Although we had expected to have preliminary information from the ALS concept definition studies by April to provide a cost estimate to the Congress, the delay in Congressional release of fiscal year 1987 funds from January until March 15, 1988, has delayed that estimate. The estimates should be available in June 1988. We plan to establish requirements, cost and technical baselines for the ALS program at the Defense Acquisition Board Milestone 0/1 review scheduled for this August. I believe the information supplied to date is sufficient to justify removal of the $50 million obligation cap. Better estimates can come only with the continuation of the program beyond the level of the cap. The purpose of the next phase of the ALS program is to refine and prove the estimates before making a commitment to the cost of full scale development. The proof can come only with initial investment in technology maturation and demonstration. Lifting the cap now is essential to our space transportation technology development. Programs begun earlier under the space transportation technology program have been halted by the ALS congressional funds embargo in the fiscal year 1987 urgent supplemental appropriation language and by the $50 million obligations cap in the fiscal year 1988 authorization bill. Those programs represent the beginnings of a national effort to regain leadership in space transportation technology after 15 to 25 years of neglect.

TITAN IV PAYLOAD UPGRADE

Senator EXON. The advanced solid rocket motors you have requested for the Titan IV are intended to increase the payload from 40,000 to about 50,000 lbs to low earth orbit. What is the funding profile for that upgrade and when will it be available?

Secretary ALDRIDGE. The Solid Rocket Motor Upgrade (SRMU) project will provide increased reliability and an alternative source for Titan IV solid rocket motors. It will also provide increased capability.

The payload range you mentioned is for an easterly launch to low earth orbit. When coupled with the Titan IV Centaur upper stage, the SRMU will provide the capability to place 12,500 lbs of payload in geosynchronous orbit. This is important for several DOD space programs currently in development. Milstar, and other classified satellites will use every bit of the current Titan IV Centaur capability (10,000 lbs) to get to geosynchronous orbit. Additionally, without the SRMU, the Boost Surveillance and Tracking System (BSTS) will not be able to achieve the required orbit. SRMU will provide a booster performance margin for these spacecraft and preclude the launch vehicle from becoming a limitation to spacecraft design and production.

When the SRMU is used on the west coast, it will increase Titan IV performance from 31,000 lbs to approximately 38,000 lbs to polar orbit. This performance capability is required for a classified program scheduled to launch from Vandenberg AFB in 1991.

Non-recurring costs for the SRMU project are:

3600 (R&D):	
Fiscal year:	
1988	$2,000,000
1989	132,000,000
1990	70,000,000
1991	9,000,000

In addition, the first 39 flight sets of motors will cost approximately $44 million per set ($7 million more than the current SRMs). After the first 39 flight sets, we expect the cost per set to be reduced to $37 million.

NATIONAL AEROSPACE PLANE INDIRECT COSTS

Senator EXON. NASA informed our staff that a letter has been or soon will be sent to Senator Stennis, Chairman of the Senate Appropriations Committee, notifying the committee of this year's cost sharing agreement between DOD and NASA on the NASP program. In testimony before the committee, Deputy Administrator Myers confirmed that NASA is including "indirect" costs of various types in the calculation of its contribution to the total NASP program. Do you find this type of accounting acceptable? Has DOD, in fact, formally approved NASA's cost figures? Is the Air Force including its indirect costs in the total program cost? Is DOD preparing, or has it already sent, a letter to Senator Stennis on these matters?

Secretary ALDRIDGE. A certification letter, required by the fiscal year 1988 Department of Defense Appropriations Act, was forwarded on May 31, 1988. This letter documented the agreement between DOD and NASA to consider both direct and indirect (or institutional support) costs in negotiating NASP cost sharing between DOD and NASA. These institutional support costs are being documented as full program cost sharing elements. With consideration of both DOD and NASA institutional support funding in the NASP program, the NASA program share is approximately 30 percent of the total program.

NATIONAL AEROSPACE PLANE FLIGHT SCHEDULE

Senator Exon. First flight of the Aerospace Plane is scheduled for about 1994. Is that to be a prototype upon which to proceed directly into full-scale engineering development? Or is it purely a technology demonstration or investigation? If this 1994 first flight schedule is maintained, when do you think NASP could be operational—serving a validated military requirement?

Secretary Aldridge. The current schedule for the NASP program calls for the X-30 to fly in fiscal year 1995 if sufficient funding is made available. The X-30 is an experimental research aircraft which will demonstrate the technologies for aircraft capable of long range hypersonic cruise and for low cost space transportation systems capable of single-stage-to-orbit with takeoff and landing from a conventional runway. These demonstrated technologies will then provide the basis for military (and civil) vehicles capable of: global unrefueled operation, reaching any point on the globe in two hours or less; providing routine, "on demand" access to near space; reducing payload to orbit cost by an order of magnitude; and flexibly based, rapid response space launch. As a technology demonstrator, the X-30 is not intended to be a prototype for any specific future operational system. If the current schedule for the X-30 is maintained, and the program is successful in demonstrating the requisite technologies, and a decision is made that such vehicles are both required and affordable, an operational NASP follow-on vehicle could be operational around the turn of the century.

MLV II COSTS

Senator Exon. What are the R&D costs per year for the MLV II? (If this is unknown, please estimate.) When will you begin to modify and integrate the payload for the MLV II and what are the costs per year? Estimate the procurement costs per year for the MLV II. Will the DSCS payload continue to be able to fly on the Shuttle or will the modifications required for the MLV II preclude that without another round of changes to the payload?

Secretary Aldridge. MLV II R&D costs are shown below. This is a preliminary estimate which may change, depending on the final contract terms for Atlas II.

MLV II development:	*Millions*
Fiscal year:	
1988	$39.2
1989	32.0
To complete	16.7
Total	87.9

DSCS satellites, programmed to fly on the MLV II beginning in fiscal 1991, will begin modifications this year to incorporate the Integrated Apogee Boost Stage (IABS). Estimated development costs are shown below, and include delivery of a test article to later be used for flight.

IABS development:	*Millions*
Fiscal year:	
1988	$23.9
1989	29.5
To complete	17.1
Total	70.5

Anticipated MLV II procurement costs are shown below. Again, these may change depending on the outcome of the pending contract.

MLV procurement:	*Millions*
Fiscal year:	
1988	$28.2
1989	104.8
1990-94	350.0
Total	483.0
Quantity:	
Fiscal year:	
1988	....
1989	2

1990-94	7
Total	9

Our estimates indicate a savings of approximately $250 million in recurring launch costs for ten DSCS missions flown on MLV-II, compared to the Shuttle. A more significant savings, however, on the order of $1.2 billion, results in non-recurring costs due to reduction in the DOD-Shuttle support infrastructure. This large savings is due to the elimination of military-related requirements in the Shuttle program.

In its present configuration, DSCS cannot fly on the Shuttle. This is due to the fact that certain safety provisions incoporated into the satellite's design have been retroactively disapproved as part of the Shuttle safety reassessment. To manifest DSCS payloads on the Shuttle, extensive and costly changes must be made to accommodate more stringent safety rules. Cost estimates are $31 million in redesign costs and up to $35 million recurring costs for each of the four satellites already built. For the six satellites in production, costs for compliance will range up to $25 million each. The IABS module is a straight forward change to the satellite, which is revertible to the current payload configuration.

ALS DEVELOPMENT AND COST

Senator EXON. Last year, Congress precluded development of an interim heavy-lift ALS for Phase I SDI deployment. In Secretary Aldridge's classified presentation to the Armed Services Committee, chart 9 shows the first product of the ALS program will be a heavy lift vehicle with a fiscal year 1998 IOC for SDI, to be followed by the "family of vehicles" which form the "objective" ALS. Is this "initial development" consistent with congressional guidance prohibiting the development of an "interim" ALS, and, if so, why? What is the anticipated cost per pound for this initial ALS to place payloads in low earth orbit? What are the 1998 requirements for ALS other than deployment of a Phase I SDS?

Secretary ALDRIDGE. There is some misunderstanding of the chart. The first product of the ALS program, the heavy lift vehicle, is associated with a 1998 IOC for SDI explicitly to identify it as the "objective" vehicle as opposed to a mid 1990's "interim" or "transitional" vehicle prohibited by law. Its goal for payload cost per pound to low earth orbit for high launch rates is $300 per pound as required by law. The family of vehicles includes boosters for smaller payloads and lower launch rates in addition to heavy lift. The intent is to develop a future generation of launch vehicles for affordable, reliable, responsive access to space. The requirements for IOCs for specific vehicles (heavy lift or others) within the ALS family are to be validated in the DAB Milestone 0 review scheduled for this August.

ALS PROGRAM

Senator EXON. Mr. Myers, you state on page 2 of your statement that NASA's Shuttle-C studies and activities are somehow part of the ALS program. DOD has never listed the Shuttle-C in any discussions with us. Are you conducting Shuttle-C studies or any other activities with DOD money?

Mr. MYERS. Both the Shuttle-C and Advanced Launch System (ALS) concepts originated from the joint NASA/DOD Space Transportation Architecture Studies (STAS) which identified the need for a heavy-lift cargo vehicle in the mid to late 1990s. Shuttle-C concept definition, initiated in fiscal year 1987, was funded by NASA in fiscal year 1987 and fiscal year 1988. No funds were requested for fiscal year 1989. ALS is funded by DOD. No DOD funds have been expended on Shuttle-C.

The relationship of Shuttle-C to ALS is that the results of the Shuttle-C and ALS studies will be considered by a NASA/DOD Executive Committee to formulate a national launch vehicle development strategy.

Senator EXON. What is the total direct cost of the NASP program?

Mr. MYERS. The total direct cost estimate for the NASP program is approximately $3.3 billion and was made at the beginning of the program. This direct cost estimate includes the current technology development phase, which is scheduled to be completed in the fall of 1990, and the design, construction, and flight test of the X-30 research vehicle, which could begin in 1991, with a first flight in about 1995.

Senator EXON. How do you define that—as the cost for the first flight of what you have declared to the test bed vehicle, or what?

Mr. MYERS. This estimated level of funding is to cover total program costs of Phases I, II, and III of the NASP program. The first phase was a concept development phase and has been completed, and we are in the middle of the technology development phase (Phase II). At the completion of this phase in the fall of 1990, the DOD and NASA will decide whether to proceed with the third phase, the construction and flight test of the X-30. Inputs to the decision to proceed with the third phase include a more accurate Phase III cost estimate from the Government and industry teams. Plans for Phase III include construction of two flight vehicles and a partial vehicle for ground testing.

Senator EXON. What are the total costs, direct and indirect, both NASA and DOD? What are the NASA and DOD shares by year over the course of the program—up to the "end" of the program, which I assume you can define in a clear and meaningful way.

Mr. MYERS. The total costs, direct and institutional support, for NASA and DOD, by year, are shown in the attached chart. The direct funds are those appropriated by the Congress for the NASP program. For the DOD, this institutional support consists of the assignment of military personnel, and the provision of indirect installation and civilian personnel support. For NASA, this institutional support consists of the assignment of civil service technical and support personnel and the operation and related maintenance of NASA facilities.

NASP RESOURCES SUMMARY
(1986 -1994)
($, M)

Fiscal Year	1986	1987	1988	1989	1990-1992	To Complete
NASP DIRECT						
NASA	16	62	70	104	331	83
DOD	45	110	183	245	1395	555
(Subtotal)	(61)	(172)	(253)	(349)	(1726)	(638)
EST. INST. SUPPORT						
NASA	30	70	80	84	214	90
DOD	--	11	11	11	33	22
(Subtotal)	(30)	(81)	(91)	(95)	(247)	(112)
TOTAL	91	253	344	444	1973	750
(Total NASA)	(46)	(132)	(150)	(188)	(545)	(173)
(Total DOD)	(45)	(121)	(194)	(256)	(1428)	(577)

The end of the NASP program is the completion of the flight research activity in the late-1990s. From an assessment of that technology base, for both earth orbital and hypersonic cruise vehicle applications, decisions would be made whether to proceed with prototype or operational vehicles.

Senator EXON. Do you plan to buy or are you considering buying Titan IVs after fiscal year 1992, and, if so, how many and in what years? Where would you launch them from and would any require the Centaur upper stage?

Mr. MYERS. Yes, potential new starts utilizing Titan IV/Centaur vehicles are the Comet Rendezvous Asteroid Flyby (CRAF) mission and Cassini, a planetary flyby, with launch dates of fiscal year 1995 and fiscal year 1996, respectively. Both spacecraft could be launched from the Eastern Test Range. In addition, the Space Station Polar Platform, to be launched from the Western Test Range, is presently baselined as dual compatible (Space Shuttle or Titan IV). If Titan IV is used, launch is planned for fiscal year 1996. The Air Force has indicated that its Titan IV planning assumes one launch per year to NASA.

Senator EXON. How do you plan to launch and service the two polar platforms if DOD doesn't pay the estimated $500 million required to reopen the Vandenberg Shuttle facility? Even if you could launch them with an ELV, wouldn't you have to service them with the Shuttle from Vandenberg? Are the polar platforms linked to the deployment schedule of the Space Station?

Mr. MYERS. Although the currently baselined plan calls for the Shuttle to launch the U.S. Space Station polar platform, the plan also contains provision for an expendable launch vehicle backup option. If the Vandenberg Shuttle complex were not to be reopened, NASA would consider this option for an ELV launch capability for the U.S. platform. The European Space Station platform is planned to be launched by an Ariane vehicle from the ESA launch facility in Kourou, French Guiana. Europe's station platform, thus, is not dependent upon the Vandenberg facility. Initially, servicing the Space Station polar platforms was envisioned in the context of the Space Shuttle. NASA is presently studying platform servicing by the Shuttle or ELV. Initial analysis suggests ELV servicing is feasible.

The polar platforms are part of the Space Station complex and their launch is part of the Station assembly sequence. In the current sequence, the U.S. polar platform is planned to be launched in October, 1995. This launch was slipped by one year last year in order to accommodate the schedules of those providing the instruments. During NASA's recent rescoping/rescheduling review, the platform launch timetable was held constant, although Station elements had their launch schedule slipped.

SHUTTLE FLIGHTS SCHEDULED

Senator EXON. How many Shuttle flights do you have scheduled for the Space Station between fiscal year 1993 and fiscal year 1995? I understand it is somewhere between 17 and 24. Just for the sake of argument, what happens to these flights if the Station schedule slips one year? Two years? Three years?

Mr. MYERS. Space Station deployment is scheduled to begin in the first quarter, CY 1995, the second quarter of fiscal year 1995. During fiscal year 1995, four Shuttle flights will initiate the launch and assembly of the Space Station. A total of 19 Shuttle flights currently are required. Were the Station launch and assembly schedule to slip, adjustments to NASA's flight manifest would be required. With the use of the Advanced Solid Rocket Motor, Space Station deployment would require only 14 Shuttle flights.

Senator EXON. Your statement (page 4) indicates that DOD will fly its nine prepaid Shuttle flights by the end of fiscal year 1991. Then you say that DOD has two dedicated flights scheduled each year thereafter. How many of the pre-paid flights are for SDIO? Has that number recently changed, as press reports claim? How many of the following years' dedicated flights are for SDIO?

Mr. MYERS. One dedicated DOD flight among the 9 is assigned to SDIO, and that is flight 41 in June 1990 for STARLAB. Another dedicated flight during the period is of high interest to SDIO and that is the combination of Teal Ruby, CIRRIS and IBSS scheduled for flight 37 in February 1990.

We continue to work closely with the DOD in scheduling of their STS flights. We have had unofficial indications that there may be adjustments in SDIO's plans for dedicated Shuttle flights. Beginning in fiscal year 1992, we have scheduled one dedicated Shuttle flight per year for SDIO for planning purposes.

QUESTIONS SUBMITTED BY SENATOR JOHN GLENN

ALS—PARTICIPATION BY FEDERAL FACILITIES

Senator GLENN. Secretary Aldridge, there has been some concern expressed over the extent of participation by Federal facilities in ALS development other than NSTL and MSFC. Specifically, what will be the tasks assigned to the AFAL at Edwards AFB? Will AFAL participate in the propulsion component technology-level testing? Also, what will be the tasks assigned to NASA Lewis?

Secretary ALDRIDGE. AFAL will participate in both liquid hydrogen/liquid oxygen and liquid hydrocarbon/liquid oxygen technology development including component level (combustion chamber and gas generator) testing. AFAL will also conduct clean solid rocket propellant development and other elements of low cost solid rocket technology and will participate in other areas such as automatic health monitoring and non-destructive evaluation. Other key participants in the ALS technology program besides NSTL and MSFC include NASA Langley Research Center, Kennedy Space Center, and the Air Force Wright Aeronautical Laboratories. NASA Lewis has not yet been identified to manage an element of the ALS technology program. We expect that they may be a member of the NASA MSFC technical team.

SPACE POLICY REVIEW

Senator GLENN. Mr. Myers, There has been some concern expressed over the extent of participation by Federal facilities in ALS development other than NSTL and MSFC.

Specifically, what will be the tasks assigned to the AFAL at Edwards AFB?

Mr. MYERS. The tasks assigned to the AFAL for the ALS Propulsion Focused Technology Program are shown in the attached table.

Senator GLENN. Will AFAL participate in the propulsion component technology level testing?

Mr. MYERS. Yes, those task assignments, as shown in the attached table, will occur through AFAL at existing AFAL facilities or at facilities available in industry. The hydrogen/oxygen thrust chamber technology testing will require a new facility at AFAL.

Senator GLENN. What will be the tasks assigned to NASA Lewis?

Mr. MYERS. The Lewis Research Center (LeRC) was a member of the ALS Propulsion Focused Technology Planning Team that defined the specific tasks to be accomplished. Although no major ALS activity is planned for LeRC, LeRC will participate in the propulsion reviews.

Should design disciplines arise, for example, in the turbomachinery area for low-cost bearings or ignition systems in the combustion devices area, LeRC's expertise in these areas will be called upon to lead the efforts.

The relationship of LeRC to the ALS Propulsion Organization is indicated in the attached block diagram.

Table 1 ALS PROPULSION FOCUSED TECHNOLOGY SUMMARY

TASKS	STATUS	ORGANIZATION	
		NASA	USAF/AFAL
LOX/H2 AND LOX/Hc ENGINE SYSTEM DEFINITION			
Space Transportation Main Engine Phase A	Existing	X	
Space Transportation Booster Engine Phase A	Existing	X	
Space Transportation Main Engine Phase B	New	X	
Space Transportation Booster Engine Phase B	New	X	
LOX/H2 ENGINE TECHNOLOGY			
LOX Turbopump Demonstration for Hydrogen Engine	New	X	
Liquid Hydrogen Turbopump Demonstration for Hydrogen Engine	New	X	
Low Cost LOX/LH2 Thrust Chamber Design and Demonstration	New		X
Low Cost LOX/Hydrogen Gas Generator Design and Demonstration	New		X
Low Cost Engine Investigation	Existing		X
Design, Fabricate, and Test an Electromechanical Propellant Flow Control System Including Valves	New	X	
Low Cost Controller/Sequencer Demonstration	New	X	
LOX/Hc ENGINE TECHNOLOGY			
Methane Turbopump Demonstration for Hydrocarbon Engine	New	X	
Low Cost LOX/Hydrocarbon Gas Generator Design and Demonstration	New	X	
Low Cost LOX/Hydrocarbon Thrust Chamber Design and Demonstration	New	X	
LOX/Hc and LOX/H2 Injector and Stability Demonstration	Existing	X	
Heavy Hydrocarbon Main Injector Demonstration	Existing	X	
Low Mixture Ratio Carbon Deposition Study	Existing	X	
Oxygen/Hydrocarbon Injector Characterization	Existing		X
Tripropellant Injector Technology - ATC	Existing		X
Tripropellant Injector Technology - P&W	Existing		X
Liquid Oxygen/Hydrocarbon Thrust Chamber Technology	Existing		X
Liquid Oxygen/Hydrocarbon Turbomachinery Technology	Existing		X
BOOSTER/CORE PROPULSION SUBSYSTEMS			
Auxiliary Propulsion System	New	X	
POGO Suppression System	New	X	
LOX Pressurization System	New		X
SOLID PROPULSION TECHNOLOGY			
Clean Propellant Processing Demonstration	New		X
Components/Process Engineering - Low Cost Advanced Nozzle/Case	New	X	
Components/Process Engineering - Castable Nozzle	New		X
Integration and Verification	New		X
FACILITIES (STE)			
Pressure-fed Component Test Facility STE - TP116 - Thrust Chamber	New	X	
Pressure-fed Component Test Facility STE - MSTL - Turbomachinery	New	X	
Pressure-fed Component Test Facility STE - AFAL 2A - Thrust Chamber	New		X

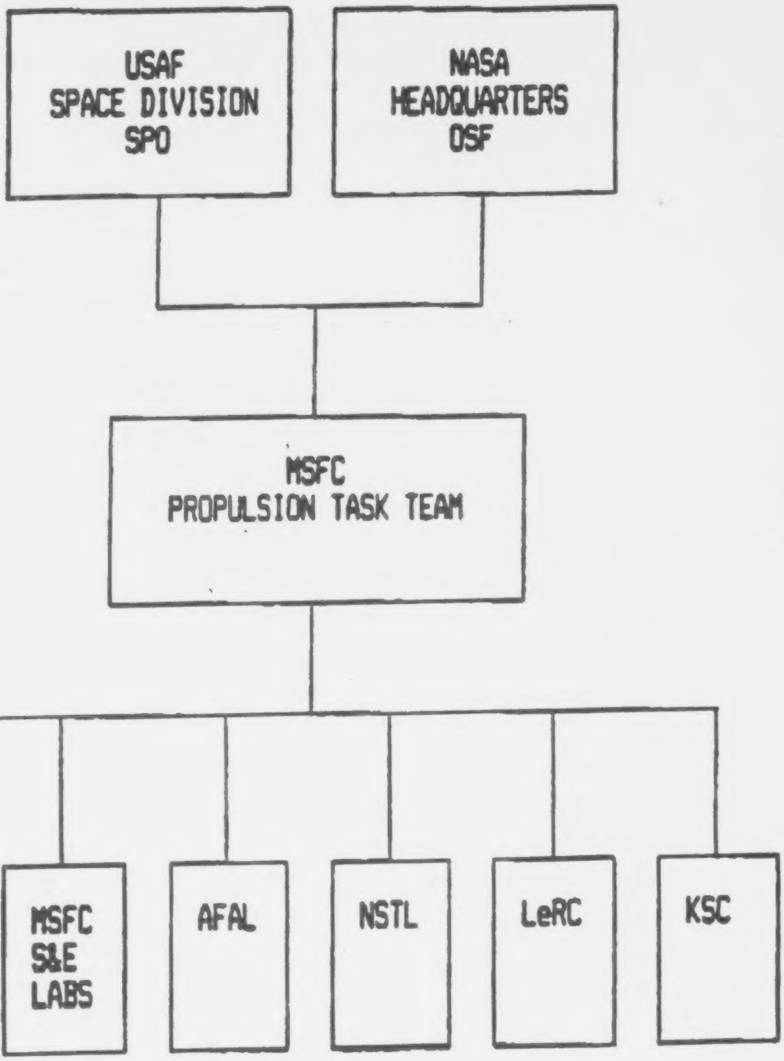

USAF
SPACE DIVISION
SPO
NASA
HEADQUARTERS
OSF
MSFC
PROPULSION TASK TEAM
MSFC
PD
MSFC
S&E
LABS
AFAL
NSTL
LeRC
KSC

FIGURE 2
LIQUID ROCKET SYSTEM DEFININTION AND
PROPULSION FOCUSED TECHNOLOGY
ORGANIZATIONAL RELATIONSHIPS

QUESTION SUBMITTED BY SENATOR STROM THURMOND

ALS COST SHARING

Senator THURMOND. Secretary Aldridge, it is my understanding that not more than $50 million can be expended for the Advanced Launch System program until certain details on program costs and cost sharing are provided. Is this information available now, and is it your intent to provide this information in the near future?

Secretary ALDRIDGE. The fiscal year 1988 Authorization language capped obligations for the ALS program at $50 million until the DOD submits a report to Congress containing an interagency agreement on design approach, a management plan, and a cost sharing agreement. The President provided the report to Congress in January. The report stated that a preliminary total program cost estimate would be available in April 1988. A total program cost estimate is an intended output of our Phase I concept definition contracts. Although we had expected to have preliminary information from those studies by April, the delay in Congressional release of fiscal year 1987 funds until March 15, 1988, delayed the preliminary estimate. It should be available in June 1988. We plan to establish requirements, cost and technical baselines for the ALS program at the Defense Acquisition Board Milestone 0/1 review scheduled for this August. Until then, program cost estimates for development and production are necessarily preliminary. The report did identify NASA/DOD cost sharing. All program costs, except for any unique civil requirements yet to be identified, will be funded by the DOD.

LAUNCH COMPLEX REQUIREMENTS

Senator THURMOND. What military requirements are driving the need for the development of launch complex 40 for DOD Titan IV operations? What, if any, cost sharing arrangements have been established with regard to commercial Titan III use of this launch pad?

Secretary ALDRIDGE. The first requirement for the conversion of Launch Complex (LC) 40 for Titan IV operations is one of assured access to space for our heaviest DOD payloads. When the Titan 34D mission failure occurred in 1986, significant damage resulted to both pads at the SLC-4 site at Vandenberg. Many months and over $60 million were required to repair the pads. If the explosion had occurred on the pad instead of 700 feet above it, it would have taken several years to rebuild the pad at enormous cost.

Until LC-40 is available for Titan IV operations in 1992, our most important national security payloads will depend on one pad, LC-41, for access to space from the east coast. With reduced performance and lower flight rates, the Shuttle cannot meet the requirements of these satellite programs and cannot provide a sufficient launch backup. New Shuttle Advanced Solid Rocket Boosters will not be available until 1994 or later leaving a significant period of vulnerability to our east coast-launched programs if that were a considered option to provide a backup for assured access.

Annual launch rate capacity is the second requirement satisfied by conversion of LC-40. DOD satellite program plans indicate the need for more than five east coast Titan IV launches per year. The rate in some years could be as high as 8-10 when NASA requirements are included. LC-41 can handle a maximum of five launches per year for missions with an Inertial Upper Stage (IUS) or no upper stage (NUS). For Centaur upper stage missions, the maximum launch capacity per year is three. In combination, Centaur and non-Centaur Titan IV launches exceed the capacity of LC-41 in 1991-1995. LC-40 will add the capacity to satisfy DOD launch rate requirements as well as provide assured access to space.

Our plans for LC-40 for Tital IV include retaining the existing capability to support Titan 34D (commercial Titan III) launches. Launch capacity on LC-40 in excess of DOD needs will be made available on a non-interference basis to the contractor for commercial launches under the terms of the Commercial Space Launch Act. Any cost differential between a Titan IV-only LC-40 and a dual compatible LC-40 will be charged to the contractor.

TITAN IV PRODUCTION REQUIREMENTS

Senator THURMOND. Can you describe for the committee the specific space requirements that lead to the need for additional production capacity for Titan IV?

Secretary ALDRIDGE. The additional production capacity for Titan IV is based on the fact that starting in fiscal year 1991, the Titan IV launch rate exceeds our ability to produce Titan IVs. Additionally, the launch rate meets or exceeds this production capability every year from fiscal year 1991–fiscal year 1995 with every indication it will continue past fiscal year 1995. Therefore we are either deficient or at the maximum rate starting in fiscal year 1991. This is the reason for an additional production capacity. The requirements for this launch rate are many. We are prepared to discuss the various Titan IV spacecraft missions but would prefer to do this in a separate classified meeting.

DSCS LAUNCH COSTS

Senator THURMOND. You indicated in your statement that there might be a significant reduction in DSCS launch costs. Can you provide the committee more details on the reason for the savings and their magnitude?

Secretary ALDRIDGE. Savings in DSCS launch costs will result from the transfer of DSCS from the shuttle to the new medium launch vehicle (MLV) II. The cost to launch DSCS on the MLV–II will be lower than on the shuttle, including non-recurring cost.

ESTIMATED COSTS

[Dollars in millions]

	MLV–II	Shuttle
Recurring costs per satellite launch	$86.1	$111.1
Non-recurring cost	158.4	1,373.2

The MLV–II provides an economical and responsive solution to meeting critical launch needs of the DSCS program. Shuttle launch schedule changes have necessitated off-load of these missions to MLV–II. This off-load addresses the national problem of satellite backlog on the Shuttle manifest while providing assured access to space through diversification of launch capabilities. Other benefits include enhancing the rejuvenation of the nation's expendable launch vehicle production base and furthering the President's policy on commercialization of space launches.

LAUNCH VEHICLES/LAUNCH SITES

Senator THURMOND. You cite an objective of our national space policy that "payloads will be distributed among launch systems and launch sites to minimize the impact of loss of any single launch system or launch site on mission performance." Will we in the near future be in a posture where there will be more than one launch vehicle or launch location available for each important military payload?

Secretary ALDRIDGE. We currently have three payloads which fit in this category. The Global Positioning System satellites can be launched on Shuttle or Delta II. Defense Satellite Communication System (DSCS) satellites can be launched on Shuttle and Titan 34D. DSCS will transition to MLV II in 1991. Defense Support Program satellites can be launched on Shuttle and Titan 34D, and will be launched on Titan IV when the Titan 34D program is completed.

There is no way to expand this posture in the near term. Shuttle performance and launch rate reductions limit its use as a DOD alternative until 1994 or later. The expendable launch vehicles in development span the range of required DOD performance levels with little overlap. Our space launch recovery plan does, however, minimize the potential impact of the loss of a single booster or launch site by: (1) distributing our payloads across six different boosters, (2) providing two launch pads on each coast for Titan IV, and (3) providing two east coast pads for Delta II.

Atlas II will be launched from LC–36A at Cape Canaveral AFS. The commercial Atlas Centaur will be launched from LC–36B. Due to the large similarity in these two configurations, it may be possible for LC–36B to also launch Atlas II with little modification. This possibility will be examined further following Atlas II contract award.

INVESTMENT IN COMMERCIAL SPACE INDUSTRY

Senator THURMOND. What is your estimate of the DOD investment, direct or indirect, that is contributing to the commercial space launch industry, and what dividends does this investment pay back to the military space effort?

Secretary ALDRIDGE. The DOD investment in the nation's space infrastructure amounts to several billion dollars. This includes our test ranges, worldwide tracking network, launch vehicle and satellite production lines, related tooling, facilities and real estate. In accordance with the Commercial Space Launch Act of 1984, the excess capacity within this infrastructure can be employed by the commercial sector on a direct cost basis.

Besides the obvious national benefits in foreign trade balance, jobs and revenue, the military space program benefits directly in lowered costs of our launch programs. Even though we cannot allocate a prorata share of fixed costs under the direct cost provisions in the law, the increased production base means lower costs for our own launch vehicles. With a small rate buy of DOD boosters such as 2 or 3 per year, the addition of 2 or 3 commercial vehicles on the production line can provide unit cost savings through economies of scale and the use of economic order quantities.

Non-economic benefits also result. Due to the higher combined production and launch rate, the experience level of production workers and launch crews matures more rapidly. We can expect a higher quality product from this greater experience.

ALS GOALS

Senator THURMOND. How would you characterize the principal rationale for the advanced launch system—is it to meet increased launch requirements, like SDI, or is it to improve launch reliability or to decrease launch preparation times or to decrease launch costs, or what?

Secretary ALDRIDGE. All of the goals you mention, increased capacity, improved reliability, better responsiveness, affordability, are key elements of the ALS program. The nation is in the process of acquiring a new family of expendable launch vehicles (Titan II, Delta II, MLV-II and Titan IV) to provide "assured access" to space in conjunction with the Shuttle. This family of vehicles shares technology and basic design with its predecessors from a common heritage in early ICBMs. Although they will meet payload mass to orbit requirements through the next decade, the vehicles offer little opportunity for more "operational access"—more affordable, reliable and responsive access to space. The ALS program is intended to provide that "operational access." To do so will require not only new vehicles and launch systems but also a fundamental change in space operations and payloads. The ALS program is to acquire a family of more responsive, reliable, flexible, and lower cost space launch capabilities across the range of payload sizes, orbits and launch rates. The ALS family of complementary vehicles that will satisfy those requirements may result from modularity in design of one or more new systems, from evolutionary application of ALS technology to existing systems, or from a combination of approaches. The program has three objectives: in the near term, to mature technology to protect the development schedule for a lower cost high launch rate/heavy lift vehicle suitable for national needs in the late 1990s; as technology is matured, to transition that technology to existing launch systems to evolve them as appropriate; and, in the long term, to develop a new family of ALS vehicles to satisfy operational, assured access requirements across the spectrum of payloads with development decisions keyed to the corresponding development decisions for payloads.

ALS—CONGRESSIONAL FUNDING LIMITATIONS

Senator THURMOND. I am concerned about the degree to which the initial authorization and appropriation of funds for the advanced launch system was encumbered by fencing for specific purposes or agencies. Do you share that concern, and what effect does such direction have on the conduct of a program that would be in the best interests of our national security?

Secretary ALDRIDGE. I too am concerned about the fencing of half of the initial ALS funds for NASA propulsion work. Such arbitrary constraints constitute an unnecessary and unreasonable challenge to those responsible for executing the program. However, the joint program office, working with the NASA and Air Force laboratories and centers, had developed a coherent, integrated technology plan for ALS that satisfies the congressional constraints.

DOD LAUNCH RECOVERY PLANS

Senator THURMOND. Have you reviewed the testimony that we will be receiving from Mr. Myers, and could you provide your views on that testimony as it pertains to the Department of Defense's launch recovery plans?

Secretary ALDRIDGE. No, but I can say that we have worked closely with NASA on space launch recovery plans including recovery progress on the Shuttle program, changes in the DOD launch mission model, estimates of NASA ELV requirements for national science missions and other areas. I am sure Mr. Myers' testimony will reflect these efforts and others, like the Advanced Launch System program, that demonstrate the cooperation between our two agencies in working to meet this Nation's space transportation needs.

LIGHTSAT PROGRAM DEVELOPMENT

Senator **Thurmond**. I was somewhat surprised to find that DARPA will apparently be entering both the payload and space launch business with the LIGHTSAT program. What are your views regarding this development, and what long term issues does the LIGHTSAT program pose for our military space program?

Secretary **Aldridge**. I believe the DARPA LIGHTSAT focus is predominately in the space launch area, which is attempting to define a low cost vehicle for small payloads. Essentially, it means a simple, single purpose, limited capability, limited life, and inexpensive satellite would be used. Such systems would not have the degree of reliability or availability normally associated with current U.S. satellites. My long-standing concern with LIGHTSAT is that it represents a point solution to a complex set of problems. This concept needs to be examined and evaluated in terms of competing solutions. The cost of the LIGHTSAT solution cannot be measured or discussed in terms of per unit costs, but rather total system and life cycle costs. This implies comparing different mission needs with alternative solutions, to include the highly capable and effective space system architectures we pursue today.

Another primary concern with LIGHTSAT is associated with requirements—where are they? For example, when I ask our commanders in the field what they need space assets to do, they want coverage and capability over 100 percent of the battlefield and they want it 100 percent of the time. This means a day-night, all-weather, real-time, jam-resistant, and survivable system. Those capabilities are not "light."

Further, the cost of building a LIGHTSAT may be the proverbial "tip of the iceberg." If the United States were to invest in a LIGHTSAT designed for a specific scenario or crisis, the real cost of the system is not in a satellite or necessarily in the launch. The real cost is in the purchase of enough systems for reliable operations, replacement, large on-orbit constellations, and a mobile ground network for control and processing of information required to accomplish even a simple mission. Finally, the operations and maintenance costs associated with these operations must be examined as they most likely will be higher than they are today.

We must ensure the United States does not experience a significant increase in cost and decrease in capability to proceed down the LIGHTSAT path. Requirements may be specified for a less reliable, less capable simple system, but such requirements should be accommodated within the joint DOD/NASA ALS program—which I covered extensively in my statement.

Let me conclude by saying that LIGHTSAT-type assessments should not stop with just booster and payload requirements and capabilities. Rather, what is necessary is a full assessment of the related infrastructure and its impacts on operational commanders. This means covering the full spectrum of personnel requirements, training, incorporation into peacetime exercises, technology demonstrations, mobile control facilities, and costs—both system and O&M. My bottom line is that LIGHTSATs are not near term. The concept requires substantially more study, scrutiny, and a fair hearing—all criteria of the PPBS process.

NATIONAL AERO-SPACE PLANE SCHEDULE/PRIORITY

Senator **Thurmond**. Do you have any technical or budgetary concerns about the proposed pace of the National Aero-Space Plane, and what priority do you attach to this effort as compared to ongoing booster procurement programs and the Advanced Launch System?

Secretary **Aldridge**. The NASP program is proceeding at a satisfactory pace. Technical progress has been excellent and the rate of overall program progress is limited by funding at the present time, not by technical attainments.

The NASP program, ongoing booster procurement programs and the Advanced Launch System (ALS) do not have the same immediate goals and cannot be directly compared. Ongoing booster procurement programs are aimed at meeting today's space launch needs by procuring already-developed boosters. The ALS is a development program for a family of vehicles to satisfy a wide range of spacecraft weight requirements. First ALS efforts are directed at a specific, heavy-lift mission and a specified Initial Launch Capability (ILC) date. The ALS family of vehicles will be based on state-of-the-art, rocket-powered, vertical takeoff technology. The NASP (or X-30) program is aimed at technology development and demonstration, leading to a revolutionary capability for manned, reusable, horizontal takeoff and landing, air-breathing, single-stage-to-orbit space transportation. Development and acquisition of operational vehicles based on NASP-derived technology would not likely lead to initial operational capability prior to the year 2000. This mix of existing and future systems is necessary to maintain assured access to space while allowing us to evolve both manned and unmanned systems toward more flexibility and lower launch costs.

Although the NASP program does not lead to operational vehicles until the turn of the century, the payoff of the program is very high, not only for space transportation but for a variety of other missions as well, both military and civil. NASP-derived vehicles could place payloads into orbit and service them more quickly, reliably and inexpensively than the current Space Shuttle or expendable launch vehicles. The extreme altitude and speed capability of NASP derived vehicles would make military aircraft less vulnerable. Ability to launch from conventional runways would enhance surprise and operational flexibility. Many potential military applications for NASP-derived technology have been investigated and preliminary results of these classified, limited access, studies can be presented to the committee upon request.

In summary, all of these efforts—ongoing booster procurements, the ALS program and the NASP program—are essential to assure our continued, affordable access to space and to maintain aerospace leadership and national security.

ADVANCED LAUNCH PROGRAM

Senator THURMOND. Mr. Myers, what are NASA's objectives in participating in the Advanced Launch Program—are they reduced launch costs, increased reliability, or some other purpose?

Mr. MYERS. NASA's objectives in participating in the Advanced Launch System (ALS) are to consider concepts to meet evolving national launch requirements and to achieve reduced launch costs and increased reliability of launch systems through the development of advanced technology.

SHUTTLE C

Senator THURMOND. Mr. Myers, you noted in your testimony that NASA is looking at Shuttle-C as an ALS concept. What potential does this approach have to reduce the sizable launch team and associated costs required to launch the Shuttle today?

Mr. MYERS. There will be no immediate impact from the Shuttle-C concept on reducing the Shuttle launch team and associated costs. The Shuttle-C concept will utilize the base capability of the Shuttle launch team, making the overall system more efficient and significantly augmenting the national launch capability. Continuing efforts to improve operations effectiveness and efficiency will be incorporated into the Shuttle-C concept design and will feedback into the Shuttle program.

NATIONAL AERO-SPACE PLANE

Senator THURMOND. Mr. Myers, you noted NASA's participation in the strong support of the National Aero-Space Plane. It is NASA's view that this technology effort needs to focus on a manned vehicle?

Mr. MYERS. Yes. All prior X-Airplanes were manned in order to fully explore and develop needed technologies for aerospace vehicles for the 20th Century, thus, giving the United States the technical options for both manned and unmanned vehicles.

NASA BUDGET CRISIS

Senator THURMOND. Mr. Myers, NASA faces a budget crisis today just as do other Federal agencies. How does NASA prioritize among its various initiatives among Advanced Launch System, National Aerospace Plane, and the Space Station?

Mr. MYERS. All of the new initiatives included in the NASA fiscal year 1989 budget request are of high priority. The Space Station is clearly one of the agency's highest priorities, as it represents an essential element of U.S. leadership in space. The Advanced Launch System is an important long term program for both NASA and the Department of Defense to provide a less expensive, more capable launch system for the future. The National Aerospace Plane program, also a joint program with the Department of Defense, will develop critical hypersonic and transatmospheric technology and also has potential for low-cost delivery of payloads to earth orbit, as well as potential commercial application.

ADVANCED LAUNCH SYSTEM CONTINUATION

Senator **Thurmond**. Mr. Myers, would NASA continue the Advanced Launch System and National Aerospace Plane programs, if DOD, for budgetary reasons, was forced to abandon them?

Mr. **Myers**. The need for a lower cost more reliable launch vehicle that provides increased capability to meet emerging requirements is important for the Nation. None of the ALS funds are in the NASA budget; therefore, if the DOD were to abandon ALS, NASA would work with DOD to meet overall launch requirements.

NASA would make every effort to keep NASP going, however, the scope of the program would have to be sized to the available budget.

NASA would continue to develop the most critical hypersonic technology areas within budget limitations to keep the potential for hypersonic vehicles alive in the United States. However, this would probably mean that there would not be a flight test vehicle available in the foreseeable future. This could adversely impact the leadership of the United States in the hypersonic aerospace vehicles.

NASA NON-DOD MANIFEST

Senator **Thurmond**. Mr. Myers, how firm is the NASA non-DOD manifest in the early 1990s, and do you agree with the DOD assumption that additional shuttle bays will not be available to DOD in that timeframe with high confidence?

Mr. **Myers**. The NASA non-DOD manifest in the early 1990s is based on a backlog of existing payloads already delayed by the hiatus in Shuttle launches. Through fiscal year 1992 the Shuttle manifest dates two to three years earlier than now scheduled. In 1993 we begin to approach a balance of payload demand versus launch capability (both Shuttle and ELVs). NASA and the DOD have worked together closely in developing the options for a mixed fleet of launch vehicles that would best accommodate the needs of all space flight requirements. On the NASA side, the result is reflected in our recently released mixed fleet manifest dated March 15, 1988. This planning is based on launch success and is subject to substantial impact if problems and schedule delays occur within either the launch vehicle or payload programs.

ADVANCED SOLID ROCKET MOTOR

Senator **Thurmond**. Mr. Myers, you noted in your testimony that the Shuttle is expected to buy back its payload to orbit performance in the mid-1990s with the Advanced Solid Rocket Motor. What is the status of the expected performance in that time period.

Mr. **Myers**. The ASRM Phase B (preliminary design) studies are just being completed. With congressional support, we expect to release the Request for Proposals to accomplish the development program in June/July of this year.

By using a more energetic propellant and increased propellant volume, and by reducing the inert weight, we believe that the 12,000 pound payload increase goal is reasonable, as supported by the design studies.

[Whereupon, at 3:43 p.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

THURSDAY, MARCH 31, 1988

U.S. Senate,
Subcommittee on Strategic Forces
and Nuclear Deterrence,
Committee on Armed Services,
Washington, DC.

DEPARTMENT OF ENERGY ATOMIC ENERGY DEFENSE ACTIVITIES

The subcommittee met in open session, pursuant to notice, at 9:06 a.m., Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Bingaman, Glenn, Wirth, Warner, Thurmond, Humphrey, and Symms.

Staff present: Robert F. Bott, Sherri Wasserman Goodman, William E. Hoehn, Jr., and T. Kirk McConnell, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Edward M. McGaffigan, Jr., assistant to Senator Bingaman; Donald A. Mitchell, assistant to Senator Glenn; Thomas Scott Bunton and Kevin T. Knobloch, assistants to Senator Wirth; Mark J. Albrecht, assistant to Senator Wilson; Samuel J. Routson and Rita Scott, assistants to Senator Symms; and Christopher E. Paine, assistant to Senator Kennedy.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator Exon. The subcommittee will please come to order.

This morning the subcommittee meets to review the fiscal year 1989 authorization request for the atomic energy defense activities of the Department of Energy. We are pleased to have Secretary Herrington join us here today.

Our Nation's nuclear materials production complex today confronts a most critical juncture. Most of these facilities were built in the 1940s and the 1950s. Like any industrial facility that has been operating for 40 years of more, these facilities are showing their signs of age.

Today we find ourselves in a situation of expecting our 1940s facilities to meet 1980s standards for health, safety, and of course the important matter of environmental protection. Yet we have not paid for the 1980s product that we must have.

It is like expecting a 1955 Chevy to meet the performance standards required of today's new cars. It cannot necessarily be done, and if it can it is very difficult and certainly very costly.

The reason we are faced with this situation today is that our Nation has not previously been willing to pay for replacement of our older facilities. We have been incrementally improving and upgrading our older facilities, rather than building new ones to replace these older facilities.

What we really need to do is to modernize our entire nuclear materials complex. This is the context in which we will be making decisions about the Department of Energy's defense programs budget for the next decade.

Congress has asked the President to conduct a study of the future of the nuclear weapons complex that will help to determine the overall size and production capacity necessary to support our national security objectives. This study is to be submitted to Congress by December 15. We hope that it will lay the foundation for taking the materials complex up into the 21st century.

The problem we will face in modernizing the complex is that we are confronting a very expensive proposition indeed. The current level of funding of the Department of Energy cannot begin to pay for a modern materials production complex that will require new sources of funding in three very important areas:

First, we need to build new facilities, such as a new production reactor;

Second, we need to clean up the environmental legacy of the past, including the decommissioning of old facilities;

And third, we need to ensure that the operation of all of these facilities, new or old, provided adequate protection for public health and safety.

Implementing this program will cost many billions of dollars. Now, I use that word advisedly, not millions but many billions of dollars. We have not yet come to grips with the reality of the modernizing of the nuclear weapons complex.

But we cannot afford to wait any longer. Every year we postpone such a decision, it becomes more expensive in the long run. We must develop our road map that will guide our work and help to set priorities.

With Secretary Herrington as our principal witness, I hope that we can take the first step in that direction today. We are very pleased to have you with us today, Mr. Secretary.

We are also pleased to welcome Troy Wade, Acting Assistant Secretary for Defense Programs.

And with that and with a last final statement in this regard to emphasize the seriousness of the situation, Mr. Secretary, which I know you agree with, I would simply say that very recently on the floor of the U.S. Senate, this committee was very much divided on one of the approaches to at least the safety angles of this problem.

We have a cleanup mess around this country with the disposal of nuclear waste that is beyond imagination, and very few have any understanding of how serious that is and how many billions of dollars we are going to have to expend there.

So in recognizing you, Mr. Secretary, I thank you for being here. We are going to let you make your presentation. There will be a short opening statement by my friend and colleague from South Carolina, the ranking member of this subcommittee, in just a few moments. But in the meantime, we are going to proceed to you.

And I would simply say that I hope that in what I hope will be a significant improvement in this program, as you the Secretary maybe will lead the charge, if you will. And when you leave your present position, I know that you will leave with distinction, and I hope that you will leave behind not only distinction, but a clear record of what Secretary Herrington outlined in the closing months of the Reagan administration as to what needs to be done, a roadmap again, if you will, as I mentioned a few moments ago, a roadmap that clearly lays out what we have to do and some possible idea of what the costs are going to be.

With that, Mr. Secretary, I am glad to recognize you.

STATEMENT OF HON. JOHN S. HERRINGTON, SECRETARY, DEPARTMENT OF ENERGY, ACCOMPANIED BY TROY E. WADE II, ACTING ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, DEPARTMENT OF ENERGY, AND DR. ROBERT BARKER, ASSISTANT TO THE SECRETARY OF DEFENSE FOR ATOMIC ENERGY PROGRAMS, DEPARTMENT OF DEFENSE

Secretary **Herrington**. Thank you, Mr. Chairman. It is an honor to be here along with Acting Assistant Secretary Troy Wade, to appear before this committee to discuss these very important issues.

With your permission, sir, I will enter a full statement into the record, and if I may I will make just a few comments.

Senator **Exon**. Without objection, we are glad to accept that and we appreciate your making an appropriate summary.

Secretary **Herrington**. The system for managing the nuclear weapons program was established by the Congress on the principle that a dual agency approach would provide the necessary checks and balances for assuring the best possible nuclear weapons stockpile and the appropriate safety, security, and control of nuclear weapons.

That principle has been maintained, it has been verified, and it has been endorsed by every administration and every Congress since 1946.

By statute and by design, the Department of Energy provides the unique technical capability and industrial capacity directed specifically to nuclear weapons and related technologies that have served this country for so many years.

This program includes the management of an aggressive and vibrant research, development, and test program, consisting of three national laboratories, whose primary mission is to support national security through nuclear weapons design and development.

The cornerstone of their efforts continues to be the maintenance of a healthy capability to assure a credible nuclear deterrent.

We also maintain the industrial capacity of the nuclear reactors and supporting fuel processing and waste handling facilities, weapons production and assembly, and reliability testing of these facilities and those that ultimately have the responsibility to dispose of the generated wastes.

We need, as you have said this morning in your opening statement, to modernize our existing facilities and the weapons stockpile to respond to the current and foreseeable national security requirements. Many of our facilities, particulary our reactors, are near the end of their useful life.

We must aggressively pursue New Production Reactor and Special Isotope Separation operational capacity, as we have set forth in the fiscal year 1989 budget. Many weapons in the stockpile are near the end of their design life. We need to continue efforts to modernize those weapons to assure the most safe and secure stockpile possible.

To assist our future planning and respond to the committee's direction, a modernization study to develop recommendations is underway. We must assure that we maintain competence and capability to avoid technological surprise.

We have already established as we sit here today a senior steering committee, and the task group has discussed the requirements with the Department of Defense. We will provide you with a blueprint of how to preserve, rebuild, and replace the facilities which support the nuclear deterrent.

While meeting production requirements, we have a fundamental responsibility to assure that our complex protects the environment and the public health and safety. You have my personal commitment how, as you had in the past, that the entire Department is behind this effort to assure that we are in the forefront of safety.

We have made significant progress through Technical Safety Appraisals, and by initiating an independent advisory board to look at nuclear safety issues. That board will report directly to me. We have been involved with the National Academy of Sciences and the National Academy of Engineering in providing independent reviews of our operations.

We still have changes and improvements to make, but an aggressive program is in place to make sure we get there. We will not operate existing facilities, nor will we build new facilities, if we cannot assure ourselves, and cannot assure you and the public, that they can be operated within acceptable risk in a safe, secure, and environmentally acceptable manner.

BUDGET TRENDS

The deficit reduction measures from the budget summit agreement suggest limited funding for the total national defense functions now and in the future. This will increase competition for the limited funding to accomplish all of the things that we are required to do.

The Department of Energy cannot accommodate our future basic operations requirements and provide the new production capability with our current share of the 050 national defense account.

In working with the Department of Defense through the Nuclear Weapons Council, we were faced with difficult options to balance program needs with funding.

The Department will fully support actions necessary to bring the New Production Reactor capability into operation by 1999. This replacement facility is required to assure a reliable source of tritium so that the nuclear weapons stockpile will remain a credible deterrent.

We are beginning this effort aggressively, with assessments and evaluations being conducted through the Energy Research Advisory Board and the Energy Systems Acquisition Advisory Board.

The $8.1 billion request for Atomic Energy Defense Activities represents a balanced program among these hard choices and keeps us on our critical path. I hope that you will support our request so that we can continue to meet national objectives and provide the foundation for meeting the future national security needs of our country.

We would be pleased to answer questions at this time.

[The prepared statement of Secretary Herrington follows:]

STATEMENT OF THE
HONORABLE JOHN S. HERRINGTON
SECRETARY
U. S. DEPARTMENT OF ENERGY

I am pleased to appear before the Committee to discuss important issues facing the Nation and this Department concerning nuclear weapons technology capabilities, and to present the Department of Energy's FY 1989 Authorization Request for Atomic Energy Defense Activities.

The system for managing the nuclear weapons program was established by the Congress more than forty years ago, based on the principle that an independent, civilian-controlled program would assure the most effective design, development, production, and ensured reliability of nuclear weapons to meet national security needs. In addition, a dual-agency approach would provide the necessary checks-and-balances for assuring the best possible nuclear weapons stockpile while providing the appropriate safety, security, and use-control of nuclear weapons. That principle has been maintained, verified, and endorsed by every Administration and Congress since the 1946 enactment of the Atomic Energy Act.

With this Committee's support, the Department of Energy has played an important role in assuring an effective nuclear deterrent responsive to national security objectives. During the 1980's, the DOE has been a key player in the Administration's Strategic Modernization Program and has met Department of Defense requirements for nuclear weapons. We have improved the quality and reliability of the nuclear stockpile. We have introduced safer and more secure weapons. We also continue to support advanced technologies and concepts such as the Strategic Defense Initiative and Inertial Fusion for future needs. To accomplish this, the DOE has been required to bring a substantial number of initiatives and facilities on line to provide the necessary technology, components, and materials. At the same time, we have significantly improved the security, safety, and environmental protection of our facilities.

UNIQUE CAPABILITY FOR THE NATION

By statute and by design, the DOE provides the technical capability and industrial capacity directed specifically to nuclear weapons and related technologies that have served the Nation so well for many years.

This includes the management of an aggressive and vibrant research, development, and test program consisting of three National laboratories. The prime mission of these laboratories is to support national security through nuclear weapons design and development. The cornerstone of their efforts continues to be the maintenance of a healthy capability for the necessary design, development, testing, production engineering, and nuclear stockpile surveillance to assure a credible nuclear deterrent. The laboratories also maintain the technology that allows us to meet our "dual agency" responsibility for assessing the safety, security, and use control of nuclear weapons. In addition to those fundamental responsibilities, significant efforts are focused on maintaining a technology base sufficient to sustain a capability for assessing evolving threats, to support future flexible response to DOD requirements, and to avoid technological surprise that could provide an adversary a significant advantage. Finally, the laboratories serve as a unique resource for supporting the Strategic Defense Initiative, determining the feasibility of Inertial Fusion, developing laser isotope separation processes, and researching advanced technologies for improving conventional munitions.

We also maintain the infrastructure to develop the products of our National laboratories. This includes 1) a base of nuclear reactors and supporting fuel, processing, and waste handling facilities to provide plutonium, tritium, and uranium materials; 2) weapons production facilities to produce the unique technology and quality components, and assemble them into nuclear warheads, and to continue quality and reliability testing over the life of the weapon; and 3) facilities to manage and ultimately dispose of wastes generated from those nuclear material and weapon production processes.

WHAT'S ON THE HORIZON?

The Administration has been successful in negotiating the Intermediate-Range Nuclear Force reduction treaty and is continuing discussions towards further arms reduction initiatives. This has brought pressure from some to reduce -- unilaterally and immediately -- our program efforts to support current and future national security policy objectives. In the near-term, however, our country must continue to assure its national security, with nuclear weapons serving as major factors in our defense posture. As long as the Nation's policy objectives include nuclear deterrence, the DOE must maintain nuclear competence throughout the complex.

This competence must be preserved, because it exists nowhere else in the United States and it cannot be readily restored if any of its major components are degraded or eliminated. The capabilities of our nuclear weapons laboratories and the production complex are national assets. The mere preservation of their capabilities has a deterrent value as do the actual warheads in stockpile. Competence must be maintained through experienced scientists, engineers, and technicians in our laboratories and production complex, who are provided with the best equipment and technology to remain in the forefront of their fields. Testing is essential in any experimental program, and in the case of nuclear weapons research, underground nuclear testing is required to obtain the necessary data that cannot be obtained in a laboratory setting. Simply stated, nuclear competence includes experienced people, the necessary equipment and technology, and testing capabilities.

Many of our facilities are near the end of their useful life. In the case of our reactors, particularly, we need to reinforce efforts to provide for nuclear material supplies during the next decade until new production reactor capability becomes operational. We need to deploy new capabilities such as modern reactors, laser isotope separation processes and improved residue recovery techniques. In addition, many of the weapons in stockpile also are near the end of their design life. We need to continue efforts to modernize those weapons to assure the most safe and secure stockpile possible. In short, DOE needs to modernize its existing facilities and capabilities and the weapons stockpile to be responsive to national security requirements -- both weapons and technologies -- into the next century.

To assist us in planning for the future and in response to the Committee's direction, we have a major study underway to develop recommendations concerning the appropriate size and productive capacity of the nuclear weapons complex. We must assure that we maintain competence and the capability to avoid technological surprise while balancing capacity with realistic workload requirements placed on us by the Department of Defense. The scope of this study spans all facets of our operations, from the national laboratories through the production complex. We expect to provide the study and recommendations to the Committee late this year.

While meeting production requirements, we have a fundamental responsibility to assure that our facilities and production processes protect the environment and the public health and safety. This reflects both my personal commitment and the commitment of the entire Department to assure that DOE facilities are in the forefront of safety. In addition, because we deal with nuclear weapons and other sensitive national security issues, we must maintain a high degree of security for our facilities. We have made significant progress in these areas -- from instituting technical safety appraisals and environmental protection plans and strategies to developing master safeguards and security agreements for our most sensitive facilities and updating safeguards and security policy. We still have changes and improvements to make, but we have an aggressive program in place to make sure we get there. We will not operate existing facilities nor build new facilities if we cannot assure ourselves, you, and the public that they can be operated within acceptable risk in a safe, secure, and environmentally acceptable manner.

We fully support the Administration's efforts to bring the Federal deficit under control. The deficit reduction measures recently concluded through the Budget Summit Agreement suggest limited funding within the total National Defense function, now and in the future. There will be increased competition for the limited funding to accomplish all of the things we are required to do. It is clear, however, that in the future, the DOE cannot accommodate the requirements for the new production reactor nor highly enriched uranium metal for weapons, if needed, with our current share of the National Defense account.

Finally, managing such a diverse and large complex requires special skills to balance programmatic needs, environment, safety and health, quality assurance, and security requirements. We believe this can be done through a process that allows for practical, realistic, and cost-effective oversight. One initiative I have taken is to establish an independent advisory board to look at nuclear safety issues. The board will report directly to me. In addition, the National Academy of Sciences has and will continue to provide independent reviews of our operations.

HARD CHOICES

In working with the Department of Defense through the Nuclear Weapons Council, we were faced with three difficult options to balance program needs with funding -- 1) reallocation of resources within the National Defense function; 2) reductions in nuclear weapons; or 3) delays in schedule to assure the long-term viability and capability of the nuclear weapons complex to meet future National Security objectives and to address regulatory requirements directed at its facilities. In the end, we made decisions that exercise all three available options.

The Department will fully support actions necessary to bring new production reactor capability into operation by 1999. This replacement facility is required to assure well into the next century that the nuclear weapons stockpile will remain a credible deterrent. We are beginning this effort aggressively, with assessments and evaluations being conducted through the Energy Research Advisory Board (ERAB). We also will deploy new, more efficient technologies and production processes with construction of a laser isotope separation process and improved residue recovery facilities. We will meet stringent environment, safety, and health, and quality assurance requirements in the operation of our facilities and processes.

We will meet Department of Defense requirements for the nuclear weapons stockpile, even though we will place the N-reactor at Richland into a cold-standby status. This action will allow us to conduct other critical activities within the available funding. We will, however, complete those parts of the N-Reactor safety enhancement program that would have been required for startup and power operation prior to placing it into standby. This will make its output available should it be necessary in the future.

FISCAL SUPPORT

The President's FY 1989 Request of $8.1 billion for Atomic Energy Defense Activities represents a balance resulting from hard choices and keeps us on our critical path. It supports the requirements for the Naval Reactors program. It also supports nuclear weapon requirements of the Department of Defense, continues activities associated with new production reactor capability and eventual operation of the special isotope separation process, initiates improvements in residue recovery techniques, continues efforts to stabilize and dispose of defense-related waste, and pursues continued security, safety, and environmental protection measures.

Later today, Mr. Troy Wade, the Acting Assistant Secretary for Defense Programs, will discuss our specific program and resource requirements. I hope you will act favorably on our request to enable us to continue to meet national objectives and to provide the foundation for meeting the future national security needs of our country. I would be pleased to respond to any questions you might have.

Senator EXON. Thank you very much, Mr. Secretary.

I am pleased now to recognize Senator Thurmond.

Senator THURMOND. Thank you, Mr. Chairman. Mr. Chairman, I join you in welcoming our distinguished panel to the subcommittee this morning.

Secretary Herrington's presence here this morning is a testament to the importance that he and the Department of Energy attach to the maintenance of a strong nuclear weapons production complex.

I want to congratulate the Secretary and Mr. Wade for a job well done during what has been a very difficult year.

At the same time, Mr. Chairman, I want to congratulate you and to thank you for your leadership on the tough issues facing the nuclear weapons production complex. Through your efforts, the Armed Services Committee has made it very clear that it would be in the forefront of all legislation affecting the complex, including safety oversight legislation.

Such leadership could not come at a better time, Mr. Chairman. As you indicated in your statement and as Secretary Herrington and Mr. Wade will testify, there are a great many challenges and problems associated with stretching to the limits a 30- to 40-year-old complex in providing for the weapons requirements of our nuclear deterrent.

Mr. Chairman, this committee took the lead last year in initiating work on the New Production Reactor. I am delighted to see that this initiative is receiving high priority in this year's budget.

I have been closely following the Department's process to select the preferred technology and site. I have made no secret of the fact that I believe the Savannah River Plant, by virtue of its facilities, work force, infrastructure, and popular support for the nuclear deterrent mission, would make an ideal site for the new production reactor, irrespective of the technology selected.

I know that the Chairman of the Armed Services Committee, Senator Nunn, shares that view, and together we have made our views known to Secretary Herrington.

While I appreciate that the world is different than it was when the Savannah River reactors were built in a matter of years, I do not understand why it will be at least 10 years before the first new production reactor will be operational.

I will be asking the Secretary today whether any measures are available to him or to the President to accelerate this project, given the fragile nature of the tritium supply over that time period. I will have some additional questions also, Mr. Chairman.

In the meantime, I have to run up to the Judiciary Committee for a little bit, and I will come back down. Again, I want to welcome you, Mr. Secretary, and commend you for the fine job you are doing and also to thank Mr. Reed for the fine job he is doing, too.

Senator EXON. Senator Thurmond, thank you very much. You certainly have been at the forefront of this whole matter of meeting the necessary requirements of our national defense as far as our production facilities are concerned, and you have also been in the forefront of assuring the best possible safeguards as far as the production facilities that are involved and are concerned.

I thank you for your statement and your interest.

PLUTONIUM

We will start the customary 6-minute rounds of questioning at this time. Mr. Secretary, a recent New York Times article attributes the following statement to you, that is somewhat confusing to me. You were quoted as saying: "We are awash in plutonium. We have more plutonium than we need."

Can you explain what you mean by this statement and how this squares with the Department's plans to build a special isotope separation facility for purifying plutonium? If we have an ample supply of plutonium, why do we need to build this billion dollar facility?

Or possibly, I wonder if your remarks have been misinterpreted or misconstrued. Also, can you explain the relationship between defense levels and plutonium requirements? Is the SIS project justified on other grounds, such as providing new technologies for isotope separation?

Secretary HERRINGTON. Thank you, Mr. Chairman.

I did use the term "awash in plutonium" during testimony several weeks ago. It was an unfortunate term because it was an overstatement. I was referring to the rationale and we were in a hot session, of whether we could or could not afford to put the N reactor in cold standby.

I have to say that in retrospect, when you look at the statement by itself, "awash in plutonium," it is not a correct statement of the facts. The proper thing for me to have said at that time—and I take full responsibility for this—was to say that we have adequate supplies of plutonium in the short-term and thereby we could justify putting the N reactor in cold standby.

That would have been a more judicious thing to say and also I think a more accurate one. And I emphasize the words "short-term," which brings us to the SIS situation.

The comment was also driven a little bit by frustration on my part concerning the amount of submarine retirements that were taking place and weapons stretchouts. There was a little bit of frustration on the impact of the defense budget cuts on our budget and the fact that we, as the budget summit progressed, only got a chance in December to start working this problem.

So I would like to correct the record at this time, and I thank you.

Senator EXON. Before you go on any further, I think that you were talking to people who are experts in both overstatement and understatement. [Laughter.]

We all get caught in those things from time to time.

Secretary HERRINGTON. Believe me, in retrospect, I did not even know I said it at the time. It was a very flip remark and it did not belong in the record.

Senator EXON. Thank you, Mr. Secretary.

SPECIAL ISOTOPE SEPARATION

Secretary HERRINGTON. SIS is a program that needs to take place for several reasons. Yes, there is adequate plutonium in the short-term.

But we are sitting on a situation with three reactors in Savannah River that are aging, that are phasing out. We have just had a cold standdown of the N reactor in Hanford, which was a major contributor of plutonium, and we are looking at a hiatus of perhaps 10 years, perhaps less if Senator Thurmond is correct and it can be done a better way.

By the 1997 timeframe, we need to provide the capability, that is the word I want to use, not just options, for this committee and for the country in case plutonium is needed. I think about what we might have for capability and I see an empty spot in our long-term planning.

SIS can fill that spot and it is designed to fill it in the 1995 timeframe, to give us the capability to produce plutonium. I think it is a very prudent program.

It is very unfortunate that my remark is being used to say we do not need SIS, because SIS is the gravamen of long-range planning for plutonium.

Senator EXON. Mr. Secretary, I think that is a forthright answer to the question I raised, and I thank you for it.

NEW PRODUCTION REACTOR

In your testimony, you state that the Department will fully support actions necessary to bring the New Production Reactor capability into operation by 1999. That is the end of this decade and the end of this century.

You also state that the Department's current share of the national defense account—and I quote your words—"cannot accommodate the requirements for a New Production Reactor." Have you informed the President and the Office of Management and Budget of this situation?

We feel from time to time that they are not really in step with us on this, nor do they fully understand the situation. What has been the reaction of the President and OMB with regard to this critical situation?

Secretary HERRINGTON. Mr. Chairman, there was a National Security Council meeting especially devoted to the weapons complex, at which I made the presentation late last year especially addressing the New Production Reactor. I assure you that the President had the full briefing and made the decision on the spot that this New Production Reactor is necessary and he will lend his full support to it.

I would not be candid if I did not say that the budgetary people, with the difficult jobs they do, were not quite in unison with that. But I believe with the Presidential decision, you will find them in line with that position.

Senator EXON. Thank you very much. My time is up.

Senator Warner.

Senator WARNER. I thank the Chair.

Mr. Secretary, I have had the opportunity to work with you when I was on the Energy Committee and for many years on this committee. I think you have done a fine job in the years that you have been in office, and I wish to commend you.

NUCLEAR-POWER ATTACK CLASS SUBMARINES

Recently, the chairman and I engaged in a colloquy on the floor of the Senate about a decision that is working its way through the administration. This decision would allow Great Britain to formally request the United States to permit Great Britain to contract with the Canadian Government. Under this proposed contract, the Canadian Government would build a number of nuclear-power attack class submarines for their navy.

My question is twofold: First, to what extent can you share with us the procedure and the timing of that decision within the administration?

Second, to what extent can you share with us your own views of this decision's impact on our national security interests. What would be the impact if our Government were to share nuclear technology, primarily power plant technology, with the Canadian Government?

Secretary HERRINGTON. Thank you for your remarks, Senator.

I have to say that no, there is no administration position at this time. And I cannot give you this morning an administration position because I do not believe that the President and the administration have made a decision. The process, as you rightly point out, is underway and I think that we could expect an administration decision on this in rapid order.

So to the extent of speaking for the administration, I am not able to do that.

Senator WARNER. But the decisionmaking process is under way. Of course, the administration recognizes that, under the Atomic Energy Act, Congress has a review of this situation?

Secretary HERRINGTON. Yes, sir.

Senator WARNER. Could you share with us some of the implications of this request by Great Britain? How will it impact on our national security interests in your view?

Secretary HERRINGTON. Do you mean my personal views versus the administration?

Senator WARNER. Yes, your personal view.

Secretary HERRINGTON. I can give you some personal reactions to it. I certainly do not speak for the administration in any way, shape or form.

Senator WARNER. That is clear, Mr. Secretary.

Secretary HERRINGTON. Whatever the President decides, I will be fully supportive.

I have, as Secretary of Energy, some grave concerns about this course of action from a technical basis; that is, in taking a country that has no prior experience with nuclear submarines and putting them into one of the most complicated technical frameworks of any weapons system today.

I mean, you do not get into a nuclear submarine and drive it the way you would get into an automobile or an airplane. It requires a great deal of expertise. So any plan that went forward must necessarily have the infrastructure of the country that is going to operate this particular program.

I have not seen anything today that convinces me that the Government of Canada is experienced in this particular area, nor do I see the building of the infrastructure to accommodate this type of sophisticated weapons system. That is number one.

Number two, I think the precedent is a very difficult situation for the United States to deal with. If we must then take country by country the requests to share nuclear submarine technology after going with the Canadian request, I think it puts us in a very difficult situation.

We in effect add another weapons system to arms proliferation, one that heretofore has been very specialized and very closely held in a limited number of countries. I do not see, in my estimation, uniform public support for this type of program in Canada, and I think any type of nuclear program needs to have uniform public support for it.

I think the precedent of putting it into a country where some in the country support it and some do not is a dangerous concept, because it encourages it to get into the political realm. And then if you change parties and one party does not support it, you have lost the technology. You have transferred the technology at that point, without getting a successful program.

I have been concerned about the claims of Canada to territorial water, the Northwest Passage and the sovereignty claims that have gone forward. One of the arguments for Canada acquiring the submarine is to enforce those territorial claims.

When the United States does not agree with those international water claims, it seems shortsighted to transfer this type of technology in order to have them enforce the claims that we do not agree with.

All of these things I think are important considerations, and so a hasty decision on this is not something that we need to get into. Finally, in discussing this submarine program with Admiral McKee and the members of the Department of Energy that are especially tasked for development of modern submarine technology, my biggest concern is that if this program is conducted by another country that is not using American technology on a very sound basis and if there were to be a nuclear accident or if there were to be efforts to do it on the cheap, so to speak, it could jeopardize the American program.

So all of these things are in my mind as we approach this kind of decision, and these are my personal views.

Senator WARNER. I thank the Secretary and I thank the Chair. These are the views which also concern me, Mr. Secretary, and I appreciate your courage in coming and discussing this today. In a moment, Chairman Nunn and I are going to meet with the Chief of Staff of the British Navy and I will raise this subject with him.

Thank you very much.

Senator EXON. Thank you, Senator.

Senator Bingaman.

Senator BINGAMAN. Thank you, Mr. Chairman.

Mr. Secretary, Mr. Wade, let me ask a couple of questions.

DUAL AGENCY STATUS

First, you refer in your statement to the dual agency status that has existed for 40 years or so. My understanding is that Secretary

Carlucci has asked that you submit your out year budget plans in April, so that he can include those in the development of DOD's budget for fiscal year 1990 through 1994.

Apparently, the intention is that your programs, your defense-related programs, be traded off against DOD programs within the DOD budget process. That is my understanding of what is contemplated there.

I guess I am concerned that there are implications in this for this dual agency system that we have always had for managing our nuclear weapons. And I really thought that OMB was the more appropriate agency to be making tradeoffs between DOE and DOD, rather than to have your programs included in DOD's out year plans.

Maybe you could respond to that and give me your reaction to it, whether my information is accurate or not.

Secretary HERRINGTON. I think your information is accurate on the request. We have gotten a little off track in the last couple of years, for a couple of reasons. First of all, I fully support the dual agency theory, that we should remain separate and independent, and I think Secretary Carlucci does, too. I think it is a good system and is working well.

Two years ago, in putting the budget together we were in a crunch, as you were here on the Hill also. And OMB instructed us to get together with DOD and work out a final budget on some disputed items. In other words, we could shorten the process because of timeframes, and we did do this.

This year, the budget summit came late in December, and again we were on a fast track and we worked very closely with DOD. I do not mean to say that these are precedents. I think that they were simply an expedited procedure that took place, and we would not expect this to continue.

So I do not see a trend or a change in the way that we do business.

Senator BINGAMAN. Well, in light of that, how would you expect to respond to Secretary Carlucci's request that you go ahead and give him your information so he can include it in his out year budgets?

Secretary HERRINGTON. Well, I think we would be very shortsighted not to give him the information. After all, we have a tremendous interrelation between our functions and DOD's functions, not only in working out our budgets, our needs, but in the contract work that we do in the national labs.

I think the working relationship between the Secretary of Defense and the Secretary of Energy is one of the most important working relationships in the Government. I mean, I'm not going to say, Frank, you cannot have our budget numbers.

I do not think that would be good management. We are going to be having ongoing discussions between us for the full time.

Senator BINGAMAN. But you do not see a problem with him including your budget numbers in the 050 accounts for his out year budgets?

Secretary HERRINGTON. The only problem is there is not enough money to go around to everybody, so we cannot have everybody in agreement. And we have just got to resolve these issues inside the administration. And if we cannot resolve them, we go to the budget review board in the administration.

VERIFICATION TECHNOLOGY

Senator BINGAMAN. Let me ask on verification. DOE has played an important role in verification technology here, particularly in connection with this INF agreement and a START agreement or the talks about a START agreement. Your budget in this area has been increasing every year.

I gather the budget proposed for 1989 is $140 million. What I would be interested in is whether you think it makes sense for us to consider a better definition of DOE's verification mission in statute, perhaps by establishing an Assistant Secretary of Energy for Security Affairs who would have a responsibility for verification, for safeguards, for arms control support, and those kinds of issues?

Secretary HERRINGTON. I would not favor the establishment of such an Assistant Secretary. I think that the situation is probably too many cooks in the pot now, with all of the different people that are working in the various agencies.

I do not think creating an Assistant Secretary necessarily brings anything into the program. It may not be deleterious, either, but it does not necessarily add anything.

We have new verification proposals now as far as a new agency for verification, and I think if that is structured right that can do the job.

Senator BINGAMAN. Mr. Chairman, did you intend to have Mr. Wade go through his testimony and then come back around for questions to him?

Senator EXON. Well, no. What we are attempting to do is to conserve the Secretary's time by letting him finish and leave. That was my plan.

But if it is the will of the committee and if the witnesses want to schedule it that way, it is perfectly all right with the chairman.

Senator BINGAMAN. I was just wondering if I should direct questions to Mr. Wade or go ahead and let everybody direct their questions to Secretary Herrington first.

Senator EXON. Well, we are in a 6-minute round and I was going to try to finish with the Secretary as soon as we could.

Senator BINGAMAN. Okay, then. Why do I not pass, and then I will have other questions for Mr. Wade.

Senator EXON. My plan was to go for one round with the Secretary and hopefully we could dismiss him at that time.

Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman.

NEW REACTOR

I fully support your efforts to get a new reactor. We have been back and forth on this issue for a long time, as you are well aware, with the safety concerns and so on, and sometimes at opposite ends of the log and sometimes working together.

But I think the newest part of our whole production complex is 25 years old. And with our continuing need for tritium, I think everyone is aware it has a 12½ year half-life, and we cannot get along without it the way our weapons are designed.

And we absolutely have to have that new reactor if we are going to have any consistency in our production program, as well as in our negotiations under arms control as to what we can and cannot do. So I think there are several areas in which it is important that we have that new production facility.

I want to support your every effort to get that thing started and under way, wherever the thing is to be built. Let me go back to one of our previous concerns, on some of the cleanup that is necessary as a result of some of the activities over the past 30 or 35 years. It happened long before your watch, Mr. Secretary, and I am fully appreciative of that.

I would hope that in the report—you have a report that is due to our other committee, the Governmental Affairs Committee, on July 1 of this year on cleanup concerns and how we get started on this whole matter. The material that we have been given so far—and I am not going to make any reference directly to it here today, except to say that I wanted to ask a question about it.

Will you not have dollar figures, even if it is some wild estimate, hooked up with that when you give us that report in July? Because that is what we need to really go to work on this.

Will there be dollar figures connected with the cleanup that is going to be necessary?

Secretary HERRINGTON. I do not think we will be prepared in July to supply the dollar figures. But let me check with Troy. My understanding is that the dollar figures are going to have to come later. [Pause.]

My understanding is we are going to prioritize it and try to get a schedule for what comes first. But as far as dollars, we will have to follow up as fast as possible.

Senator GLENN. Well, we had asked for the dollar figures, I believe, to be included with that. I would hope you could give us some estimate of the dollar figures at least, because our hands are tied.

You can put out the finest report in the world to us that prioritizes things. But unless we have some idea of the dollars involved, we cannot take action and so we really have not accomplished anything.

I would remind you that we have for some 3 years tried to get this information. And finally, after badgering and badgering, I got a promise last year that this report would in fact finally, after 3 years of talking, that we would finally get some report by the 1st of July.

Now, I had hoped that, even if it is clearly spelled out in red letters in the report, and these are only estimated figures, that we would have something to go on. Otherwise, all we have is the New York Times reports, where your Under Secretary, Mr. Salgado, says that, yes, $100 billion for the cleanup, and this is his quote, is probably in the ballpark.

I do not know what he bases that on. I imagine it is just an intuitive guess, probably. I do not know.

Joe LaGrone down in Oak Ridge comments on some of the specifics with regard to certain sites, as to what has already been done there. And I am complimentary to you for getting started in some of these areas that we have had concerns about.

I am glad you are moving in those areas. No former Secretary has done that, and you are to be complimented for that. And you are the first to do it, because you are moving in some of these areas.

Secretary HERRINGTON. Thank you.

Senator GLENN. But this is something that just cannot wait. You know, you feel like Paul Revere out there, warning the American public about what is going on. And just prioritizing the problem without hooking dollars to it, does not let the Congress help you.

It prioritizes and shows us where the greatest danger is, but we have to have an estimate in each of these areas. And I think we are going to be in the tens of billions of dollars for a number of years. That is my impression, and even Mr. Salgado says $100 billion just for cleanup, even without the new plant being constructed, is probably in the ballpark.

So I would urge you, even if your figures are very tentative figures, to at least give us something in that July report, so that we can have something at least to start trying to get budget figures in and to push the next administration, be it Democratic or Republican, to come in with budgets that will help us start doing the job.

I know that is more of a statement than a question. But I would welcome your comments. Can you possibly give us some dollar figures? Otherwise, it is sort of a useless report that we will have to update later on when we get around to the dollars.

Secretary HERRINGTON. Senator Glenn, if you will permit me, I will go back and see if we can provide preliminary estimate dollars in that report. I think your criticism is justified on that and I will see what we can do.

Senator GLENN. Put yourself in our spot here. I want to help you. I want to do something about it. We have been on this issue for so long. And yet, our hands are literally tied.

We are in a straitjacket at this end of the avenue unless you can tell us how many dollars you need to get started and what sites have priority.

Secretary HERRINGTON. I would think we would be able to do that, and I think your criticism is legitimate. And let me see what I can do to change that.

Senator GLENN. Thank you.

Secretary HERRINGTON. Mr. Chairman, may I take one minute out of sequence?

Senator EXON. Certainly. Go ahead.

Secretary HERRINGTON. I sat in front of the television last night and watched Arts and Entertainment between 9 and 10, which had a movie, a documentary called "Rocket Pilots," in which Senator Glenn was prominently profiled.

Senator GLENN. And I missed it. [Laughter.]

Secretary HERRINGTON. I will tell you, I brought my own daughter in. It was great. Sometimes we forget some of the contribution that he has made. He was young-looking, taking a lot of risks. [Laughter.]

He is still young-looking, but not taking the same risks.

Senator EXON. He sure has changed. [Laughter.]

Secretary HERRINGTON. No, no, he has not changed a bit. [Laughter.]

I just wanted to recognize that, Senator Glenn. You know, that was a while ago. But I will tell you, it was still just as exciting last night. I was glued to that thing for an hour.

Senator GLENN. Thank you. I did not see that last night, but I can guarantee you I am going to fight for whatever money you want from now on. [Laughter.]

Thank you very much. I appreciate it.

Thank you, Mr. Chairman.

Senator EXON. Thank you.

And thank you for mentioning that, Secretary Herrington.

We are glad to have Senator Wirth join us this morning. Senator Wirth.

Senator WIRTH. Thank you very much, Mr. Chairman.

SIZE AND SCOPE OF BUDGET PROBLEM

Let me if I might, Mr. Secretary, in the time that you are here, talk a little bit more about the size and scope of the budget problem facing us. It is my own belief that this is—what we are talking about here in the overall nuclear weapons complex in terms of cleanup and in terms of modernization—in effect the great black hole of the budget.

And the American people do not know that it is there, and that if we are not careful the administration is going to get out of town before we get toted up the size and scope of the problem that we face. And that is not fair.

I know you have been the first Energy Secretary to really focus on this, and I join with Senator Glenn in praising you for doing that. But we have got to get these numbers out there so people understand.

CLEAN UP

Let me go back if I might for just a second and talk about that. The question of cleanup is the one that Senator Glenn talked about. You said you did not have the number yet.

But last week before the House Energy and Commerce Subcommittee, Mr. J. Dexter Peach of the General Accounting Office testified that the cost of cleaning up the environmental contamination at the nuclear weapons production plants could be as much as $100 billion. And as Senator Glenn pointed out, Under Secretary Salgado said that $100 billion is probably in the ballpark.

So we have got two people, your Under Secretary and the expert from the General Accounting Office, talking about $100 billion for cleanup. Now, this is for cleanup. Do you think that is about right?

Secretary HERRINGTON. Let me tell you that I cannot comment on it because we do not know the full extent of the problem. I will give you an example. Our facilities go back years.

There is one place in California where during the Second World War barrels were dumped into a ravine and covered over. We do not even know what is in the barrels.

Senator WIRTH. I understand.

Secretary HERRINGTON. You see it is big.

Senator **Wirth**. But the problem is we have two authorities, one, your Under Secretary and second, the General Accounting Office, saying that cleanup only is probably realistically looking at $100 billion. That is one side of it.

Let me go on before my time expires and talk about the complex overall. A former Defense Department official, Frank Gaffney, in the Wall Street Journal this month, the 11th of March, said:

> Today, as a result of years of low budgetary priority, maintenance deferred, investments foregone, and obsolescent designs, key elements of the nuclear weapons infrastructure are in extreme. No industrialist could stay in business with the rate of capitalization sustained for years by the Nation's nuclear production infrastructure. It is increasingly unclear whether the U.S. Government's nuclear weapons complex can, either.

MODERNIZING THE NUCLEAR WEAPONS COMPLEX

What Mr. Gaffney is saying, as you know, is what I have been suggesting for a long time: that we have not only an aging complex on our hands, but one that is becoming increasingly dangerous, and that we are facing not only a cleanup expense but a huge tab coming down the line for the American taxpayer to modernize the nuclear weapons complex.

We cannot go on the way that we are going now. That is the purpose of Mr. Wade's 2010 project coming up, which we are going to hear from by apparently the 15th of December, is that right, Mr. Wade?

Mr. **Wade**. [Nods affirmatively.]

Senator **Wirth**. What is the tab going to be? What is the cost going to be to the American taxpayer to upgrade and renew this complex?

Secretary **Herrington**. Senator Wirth, I take strong issue with one statement that you made. We do not have an increasingly dangerous facility. We have old problems that need to be fixed.

But if anything, there is more attention on environmental health and safety in this complex today than there has ever been. So the risk is not increasing. The issue is what do we do about what was done in the past.

And yes, the tab is going to be big. But I do not think we can walk away from it.

Senator **Wirth**. Then let me temper my comment, although I would stand by the statement that I made. Let me temper my comment only by saying that we know we are going to need some kind of new production reactor. Senator Glenn has pointed that out and you all have urged that, and the President has said we have to do that.

The plants in Ohio representated by Senator Glenn are, as you know, old and by all evidence increasingly dangerous. We have shut down Hanford. We have got a plant at Rocky Flats in Colorado, in my backyard, which we have all agreed would not be built there in the future if we were making that decision today and probably is not going to be there forever.

In looking at modernization, we are talking about new parks, is that not right, Mr. Wade?

Mr. **Wade**. [Nods affirmatively.]

Senator **Wirth**. Bringing a new nuclear complex together in several parks. The question is what is that going to cost us to do.

We have established on the one hand about a $100 billion bill for just cleaning up. What is the modernization going to cost us?

Secretary **Herrington**. You are quite correct, the number is a large number.

Senator **Wirth**. Well, what is it? $2 billion, $5 billion, $50 billion, $100 billion, $200 billion?

Secretary **Herrington**. I do not think we are in a position to say. I would say it is more in the magnitude of tens of billions.

Senator **Wirth**. And tens is how much?

Secretary **Herrington**. Tens of billions, sir.

Senator **Wirth**. I mean, is that $20, $50, $100 or $200 billion?

Secretary **Herrington**. Well, I obviously cannot answer it without knowing the extent of what we are going to do. And we do not even know today the extent of the cleanup problem. We do not know today what technology will be used for the new production capability. I hope to know by summer.

We do not know where it is going to go. Can we save money by going to the WNP-1 in Washington State? Do we go to heavy water?

We need to make those decisions before we give you that number. As far as Rocky Flats, we would not build it in the same place today. What has happened is that the city has grown around it, so we would not build it in that populated area. But the decision to build it, nobody can be criticized for that.

Senator **Wirth**. No, I am not saying that. If we were to do it again, we would not put it there. You know that, I know that, we all know that.

Mr. Chairman, my time has expired. The purpose of what I wanted to get across right now is the job that you have, that I have, and that all the members of this committee and the Senate have in understanding the fact that we have out there a huge bill that is not in anybody's budget, and that is a huge bill for cleaning up that the GAO says is $100 billion and the Under Secretary of DOE says is probably $100 billion—$100 billion.

And that we have coming on line, coming up, which we will get to with Mr. Wade, the 2010 study, which I think is going to be, as you point out, the tens of billions of dollars, probably $100 billion as well. You know, we have out there possibly as much as $200 billion of costs to the American taxpayer to build a new plant and to clean up the old plant.

Now, the sooner we get out in front of people the reality of these numbers, the better off we are going to be. It is very bitter medicine indeed, but it has got to be out there. We have to be realistic about it. We cannot duck it.

And I would hope, Mr. Secretary, that you would heed very carefully Senator Glenn's request, and I know you want to do that. And let us see if we can get these numbers out as rapidly as possible.

Let us not wait until the end of your shift. Let us get those out here so that we can all share the urgency of this. I know you are not trying to get out before having those numbers there, but I would just urge us all to recognize the fact that we have an enormous environmental problem and an enormous safety problem, and it is going to be very, very expensive.

That is it. I am not knocking you at all. You have done more than any other Secretary has done on this, Mr. Secretary. I just want to try to add a little fuel to it.

Secretary HERRINGTON. Thank you for saying that.

The December report that you mentioned will have preliminary figures in it. I am sure we can do that. The July preliminary report on the environmental cleanup is the one that I think we need to do more work on and get preliminary figures.

But I appreciate what you have said.

Senator WIRTH. We are also looking at a 5-year budget, as Senator Bingaman pointed out. We have a 5-year budget cycle. You are trying to put numbers up on that, and that presumably has to include some numbers as well. It has to include some cleanup and some new plant numbers for the next 5-year cycle.

And I would think that that has to be a part of this whole thing.

Mr. Chairman, thank you very much. I will look forward to exchanges with Secretary Wade as well.

Senator EXON. Thank you, Senator Wirth.

I am happy to recognize Senator Symms.

Senator SYMMS. Thank you very much, Mr. Chairman, for allowing me to be here this morning. I am actually not a member of this subcommittee, but it is a subject that Senator Bingaman and I have discussed in the other subcommittee on the industrial base and technology, and I appreciate your willingness to have me here.

This is a subject I am very interested in. It is good to see Secretary Herrington and Troy Wade over here addressing this.

I appreciate the questions that Senator Wirth just asked and addressed, and I understand, Mr. Secretary, that you have already addressed the question of "awash in plutonium," and I thank you for your clarification of that.

Troy Wade can tell you that we have a small delegation with loud voices in Idaho that has quoted that to us quite regularly, and I am glad you clarified that.

I want to first ask unanimous consent that my entire statement be made a part of the record if I could, Mr. Chairman. I ask unanimous consent that my statement be made a part of the record.

Senator EXON. Yes, it will so be.

[The prepared statement of Senator Symms follows:]

PREPARED STATEMENT BY SENATOR STEVEN D. SYMMS

Everyone on this committee knows how the Nation's nuclear material capability has deteriorated over the past 18 months. With two reactors shut down, and the remaining three reactors operating at less than half power, it's clear we may be vulnerable to disruption of our materials supply.

This committee recognized the seriousness of the matter by providing language in the Defense Authorization Act for 1988 and 1989, that directed the Secretary of Energy to submit a report to us describing an acquisition strategy for a new production reactor. I supported that provision, but thought it did not go far enough, so Senator McClure and I added an amendment that required DOE to study two reactors.

I would like to make clear right now, that when I say "two reactors", I don't mean two big reactors; but rather smaller, modular components built at two sites. There are many positive aspects to a modular, two sites approach for new production capability and I want to ask you some questions about this. But first, I want to comment on the safety aspects of a new reactor. I think it is vital that the Department of Energy carefully and seriously evaluate the safety characteristics of all the technologies being considered for the New Production Reactor.

Safety concerns shut down one production reactor. Safety issues led to the reduction in power at the three other plants. I am convinced any new reactor must provide the highest degree of safety attainable from among those designs being considered.

Obviously, tritium production must be the major goal of the plant. But I believe that before any new plant can be built, it must have public acceptance. That can only come through public confidence in the safety of the design and the operation of the plant and equipment.

I believe it would be a serious mistake to use a technology that is already obsolete when we have others waiting in the wing that can do the job. I happen to believe from a safety and production perspective, the High Temperature Gas Reactor holds great potential. I know it is one of those being evaluated by the ERAB panel and I urge DOE to look closely at this technology—at all the advanced reactor technologies that can also produce electricity. Power sales that would offset the cost of the plants would be a great boon to the American taxpayer, and if we should have an arms control treaty that stopped material production, we would still be able to operate the reactor for energy purposes—a set up similar to that of the Soviets.

Whatever reactor is chosen will be operating in the 21st century, so we have the opportunity—the responsibility to provide for the future.

Senator SYMMS. Then I want to say, Senator McClure and I added an amendment that required two reactors. And what I wanted to make clear was that we are not talking about two big reactors, but rather smaller, modular components, to be built at sites from the standpoint of national security, so we do not put all our eggs in one basket.

I would have to say that from my examination of this question, I am very interested in the high temperature gas reactors, because they have so much versatility. If in fact some utopian day ever comes, which I do not believe it ever will in our lifetime, that we did not need production reactors, you can make electricity with them, and they are high technology.

I just wanted to urge you, Mr. Secretary, to have your panel carefully examine that technology. And I assume that is being done, is that not correct?

Secretary HERRINGTON. Yes, the panel is examining not only sites, but primarily technology, and that is one of the technologies they are looking at.

TWO REACTOR STUDY

Senator SYMMS. So you are familiar with the language in the DOD Authorization Act that calls for a two reactor study, is that not correct?

Secretary HERRINGTON. Yes.

Senator SYMMS. Is DOE taking that seriously as a congressional mandate?

Secretary HERRINGTON. Yes. We have asked the ERAB Board to look at duality as one of the issues, and they are in fact doing that.

Senator SYMMS. I guess my appeal to you, Mr. Secretary, and to Mr. Wade is not to get trapped into technology that is old technology, but to try to use the newest technology to address this problem. And I believe—of course, I am not a scientist, but just from my study of it, that the high temperature gas reactors have a great potential.

And they have one other aspect militarily that we should all think about, and that is the ability to build them in modular form and not have to have them all at the same place. I think that strengths the flexibility. If in fact there were, say, an accident at one place or another, you would have production somewhere else. Or if we were under military attack, it would be good to have them spread out.

So I think it would be really a good idea, and I would hope that we could really examine that, so that when we get a 21st century reactor operating that it will be of the state of the art technology.

Mr. Chairman, could I ask this. We have the new Administrator of the Federal Highway Administration coming before the Public Works Committee, and I would like to ask unanimous consent to submit a few questions just for the record if I could, and save our witnesses some time here.

Senator EXON. Thank you very much, Senator Symms. I appreciate that and we will be able to put your statement in the record.

Senator SYMMS. And I want to submit a few questions for the record also.

Senator EXON. I am sure the Secretary understands that there will be some questions for the record and that he will answer those as soon as he possibly can.

Secretary HERRINGTON. Yes, sir.

Senator SYMMS. They are not very difficult. Just a few things that I would like to clarify. But I will not drag you through them here this morning. Thank you very much, and thank you, Troy.

Senator EXON. Senator Thurmond, do you have any further questions for the Secretary?

Senator THURMOND. I have a few questions for the Secretary, yes.

Senator EXON. Then please proceed.

NEW PRODUCTION REACTOR

Senator THURMOND. Secretary Herrington, I am not satisfied that a new production reactor should take 10 years to become operational.

Is this schedule budget-driven or process-driven? And are there any measures available to you, to the President, or to the Congress to waive EIS or other requirements to accelerate the schedule?

Secretary HERRINGTON. Senator Thurmond, I am not satisfied either that this takes 10 years, and I would doubt if it does take 10 years.

I think what you are looking at is a historical number that has always been used. My belief is it can be done a lot faster and should be done a lot faster. I think that is entirely too long.

Senator THURMOND. Mr. Secretary, to what extent will nondefense-related considerations, such as support for nuclear energy technology, weigh in the decision to select a preferred site and technology for the New Production Reactor?

What are the principal criteria that you will use to make the interim decision on preferred site and technology?

Secretary HERRINGTON. I think I will have to wait and see the result of this study by the ERAB panel as to what the options are and what the pros and cons of each option are.

You heard a minute ago Senator Symms urging the high temperature gas cooled reactor, because it would have application to commercial uses as well as defense uses. Obviously that is something that Congress has asked us to study and we will take into consideration.

Senator THURMOND. Mr. Secretary, I know that you have taken a personal interest in keeping the Department at the forefront of safety.

As you know, this committee reported favorably on S. 1085, which would establish an independent safety oversight board and would be advisory in nature. I understand that you do not support this legislation, and I invite you to put your views on the record now, or put them in the record if you would like to do that.

Secretary HERRINGTON. I would like to say something briefly to this committee on that, because I believe it is an important issue for us in the Department.

ENVIRONMENT AND SAFETY

Since I have become Secretary we have taken several steps toward environment and safety. One, we elevated this role to the Assistant Secretary for Environment, Safety, and Health.

We created this position. We funded it initially at $34 million. We brought this under one coordinating body, and set up experts in that area. We have expanded the environment, safety, and health budget 80 percent in the last 3 years.

I have instituted comprehensive safety appraisals, architectural reviews, and environmental studies of each of the defense facilities. We have executed 28 environmental compliance agreements with EPA and with the States.

We have initiated two safety investigations by outside experts—the Roddis Panel and the National Academy of Sciences, which is reviewing all energy defense facilities, and we have established a permanent panel of outside experts headed by John Ahearne, a former NRC Commissioner to be active in advising us on this.

My belief is that you should allow this program a chance to work, that you should not move precipitously to stop this program from working. My recommendation is that you would give us a year to have this program take effect and work.

We have shut down facilities, and we have throttled back facilities. I am specifically referring to the PUREX facility in Hanford, Washington. We made a decision based on the enhanced safety recovery to put the N Reactor in a standdown mode.

We throttled back the Savannah River reactors when the National Academy of Sciences questioned the statistical base for power levels.

What I am saying is the Department is doing very well in this area. Better than it has ever done. And if we have not delivered on our promises within the next 12 months, I will personally come back in front of this committee and recommend that you put independent oversight in.

Here is my objection to the independent oversight. You do not necessarily increase safety and you do not necessarily establish good government. What you do is set up an adversarial relationship versus having one man, the Secretary of Energy, to sit here in front of you and be hammered for not doing the job.

You ought to insist that the Secretary of Energy do this job, and make him accountable to this committee—and not set up an independent oversight body and more bureaucracy. If you do that you are transferring the primary responsibility for safety to a separate board and away from facility operators, which does not make them accountable.

I think that safety must be an integral part of day-to-day operation for people like myself, Troy Wade, and Mary Walker, who was an Assistant Secretary. You must hold us accountable and not someone else.

S. 1085 interposes in the operation of our defense facilities a new agency, and it fragments our responsibility. I think that is what I am trying to say.

I think those are my general remarks, and I would ask you, if you can, in reviewing this and in working through the problem, to look for the most effective management and accountability to the officials that are charged with this responsibility, and give us a period of time to perform on our promises. Thank you.

ENERGY RESEARCH ADVISORY BOARD

Senator **THURMOND**. Mr. Secretary, what is the Energy Research Advisory Board? And does the membership of this board reflect the national security concerns inherent in the New Production Reactor?

Secretary **HERRINGTON**. The Energy Research Advisory Board is a board appointed by the Secretary. It has diverse interests on it, scientists from all fields.

The subpanel that is looking at the New Production Reactor technology I think is well qualified to address the national security interests. I would be pleased to submit their names and qualifications to the committee.

[The information follows:]

ERAB PANEL ON NEW PRODUCTION REACTOR TECHNOLOGY ASSESSMENT

Name	Expertise	Experience areas
L. Papay, chairman, senior vice president, Southern CA Edison Co., P.O. Box 800, Rosemead, CA 91770.	Engineer, Ph.D.	Senior utility executive advanced energy R&D.
F. Baranowski, consultant, 657 Fairfax Way, Williamsburg, VA 23185.	Chemical engineer	Former DOE officer, nuclear fuel cycle and production.
W. Behnke, vice chairman, Commonwealth Edison Co., P.O. Box 767, Chicago, IL 60603.	Engineer	Senior utility executive, member National Academy of Engineering.
V. Boyer, consultant, Philadelphia Electric Co., 2301 Market Street, Philadelphia, PA 19101.	Nuclear engineer	Senior utility executive nuclear operations, member National Academy Engineering.
F. Buckman, president, Consumers Power, 212 W. Michigan Ave., Jackson, MI 49201.	Nuclear Engineer, Ph.D.	Senior utility executive, nuclear facilities management and operations.
R. Budnitz, consultant, Future Resources Associates, 2000 Center St. (Suite 418), Berkeley, CA 94704.	Physicist, Ph.D.	Environmental systems and technology.
F. Culler, president (retired), EPRI, Box 10412, Palo Alto, CA 94303.	Energy engineer	Senior utility R&D executive, former deputy director ORNL, numerous awards, member National Academy of Engineering.
J. Gavin, president (retired) Grumman Corp., 1111 Stewart Avenue, Bethpage, NY 11714.	Aerospace Engineer	Senior aerospace executive, former president, chief operating officer, and director Grumman Corp., member National Academy of Engineering.

ERAB PANEL ON NEW PRODUCTION REACTOR TECHNOLOGY ASSESSMENT—Continued

Name	Expertise	Experience areas
L. Roddis, consulting engineer, P.O. Box 1513, Charleston, SC 29402.	Mechanical engineer	Former board chairman and president of Consolidated Edison Co. NY, nuclear Navy and utilities, member National Academy of Engineering.
J. Schoettler, independent petroleum geologist, 11855 East Daley Circle, Parker, CO 80134.	Geologist	Petroleum, chairman energy research advisory board.
N. Todreas, head, department of nuclear engineering, MIT, 77 Mass. Ave., Room 24-108, Cambridge, MA 02139.	Nuclear engineer, Ph.D.	Educator, department chairman, broad nuclear experience.
V. Tschinkel, senior consultant, Landers, Parson & Uhlfeder, P.O. Box 271, Tallahassee, FL 32302.	Zoologist, biologist	Environmental specialist, formerly secretary Florida Department Environmental Regulation.
A. Weinberg, distinguished fellow, Institute for Energy Analysis, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, TN 37820-0117.	Physicist, Ph.D.	Eminent nuclear scientist, science policy and energy analysis, numerous honors, former Director Federal Energy Administration, member National Academy of Science and Engineering.
R. Gens, consulting engineer, 4046 SW Jerald Court, Portland, OR 97221.	Electrical engineer	Former Chief Engineer Bonneville Power Administration, electric transmission.
J. Gilbert, vice president, NJG Inc., 20030 Century Blvd., Germantown, MD 20874.	Engineer	Former DOE official, nuclear safety and strategic materials production.
J. Gray, president, ERC International, 3211 Jermantown Road, Fairfax, VA 22030.	Chemical engineer	Nuclear industry research and management, energy and nuclear fuels policy.
J. Hendrie, senior consultant, Brookhaven National Lab, Building 197C, Upton, NY 11973.	Physicist, Ph.D.	Former Chairman NRC, reactor design, member National Academy of Engineering.
K. Lathrop, associate director, technical division, P.O. Box 4349, SLAC, Stanford, CA 94309.	Engineer, physicist, Ph.D.	Reactor, physics, safety, and computer systems.
R. Patrick, Francis Boyer Chair, Department of Limnology, Academy of Natural Sciences, 1900 Parkway, Philadelphia, PA 19103.	Botanist, Ph.D.	Limnology, Ecosystems, environmental policy, member National Academy of Science.
D. Pimental, professor, Department of Entomology, 6126 Comstock Hall, Cornell University, Ithaca, NY 14853.	Entomologist, Ph.D.	Professor of ecology and agricultural science, environmental resource management and pollution, many policy advisory panels.

Secretary HERRINGTON. But I believe we have the right people looking at this. The ultimate decision will be the Secretary's on what technology and what location. But I think they are qualified to make recommendations.

Senator THURMOND. Mr. Secretary, I have one or two more questions that I will submit for the record to save time. Thank you, Mr. Chairman.

Senator EXON. Senator, thank you very much. We are about to discharge you, Mr. Secretary. We would like to have you stay around as long as you can, of course. But I know you have some other things to do.

When you do leave, Mr. Barker, I understand, will take your place at the witness table to answer questions on behalf of the Defense Department on this whole general area. I would just like to say, before you leave, that I want to congratulate you for taking the stands that you have on the further proliferation of our nuclear submarine technology.

I think that is a very, very serious matter that this Senator first raised, and I am going to continue to press it because I have not decided whether I am all for or all against it.

But I think it has been moving into an area far too rapidly, without Congress having the necessary input that is required under the law.

Second, I am not totally satisfied with your answers to my questions today with regard to what this is going to cost. That has been followed up by other members of the committee.

I would like to ask that as soon as you can, within the next 30 or 60 days, write me a letter outlining in more specific detail how much money you think it is going to cost to bring the new facilities on-line that we have discussed here this morning, to do the cleanup that is necessary, that we have discussed here this morning.

In other words, what I would like to have is a statement from you as the Secretary responsible in this area to outline for this committee and for the Congress, and for the American people, how much it is going to cost to get all of this done.

Because if there is a best-kept secret in Washington today, it is the fact that too few people know and understand the depths of this problem. So I hope if we could pick a date, by May 15 or June 1, if you could by that time get these to us. And I recognize you cannot tie this down to an exact figure because we do not know.

But I would like to have in the form of that letter from you some kind of a, maybe a maximum figure, $200 billion, $300 billion, and a minimum figure, $100 billion to $200 billion, whatever it is, that you honestly feel, in between those two, are the costs that we face in this whole general area.

Would that be an unreasonable request on my part?

Secretary HERRINGTON. No, sir, Mr. Chairman. It would not. And we can do it. We will try to have that by May 15, if not sooner.

Senator WIRTH. Mr. Chairman.

Senator EXON. Senator Wirth.

Senator WIRTH. I think that is a very reasonable and a very important request to be fulfilled.

DOE BOW WAVE

It seems to me that another way of putting this, Mr. Chairman, might be to talk about the DOE bow wave. You know, we have talked about that a great deal on the DOD side, that we have made commitments here and that those are going to be very significant in the future.

It seems to me that probably in your own Department, Mr. Secretary, we are going to be faced with a very significant bow wave. We have that in the defense side of the Department of Energy.

Savannah River has a cost of cleaning up estimated between $3 billion to $13 billion. We have a number of reactors at Hanford, I think six or seven, is that not right? That are so-called in standby right now?

Secretary HERRINGTON. Six or seven.

Senator WIRTH. How many are there at Hanford?

Secretary HERRINGTON. The N Reactor is the only one and it is being placed in cold standby.

Senator WIRTH. What are the other reactors at Hanford that have not been decommissioned?

Secretary **Herrington**. Senator Wirth, we do have some old sites that need to be cleaned up there.

Senator **Wirth**. And how much is the cost of those? You know, if we were to follow the law, all of those have to be cleaned up and do what we are doing at Shippingport. Is that not right?

Secretary **Herrington**. That is right.

Senator **Wirth**. What is the cost of cleaning up each of those?

Secretary **Herrington**. Large.

Senator **Wirth**. Very significant.

Senator **Exon**. Well, I think that is all included in the request that I made. I am looking at the broad picture, and I think the Secretary has agreed to that.

Secretary **Herrington**. Yes, sir.

Senator **Wirth**. Mr. Chairman, if I might just add, we have a space station that has been proposed. We have a superconducting supercollider, which has been proposed. We have a variety of other new projects that are presumably in the same pipeline.

And it seems to me what we do is give all of the attention to the new high-visibility, very attractive items, and the American taxpayer says, hey, wow, that would be a wonderful thing to do.

But at the same time, we have got to remember that there are all of these very mundane items that have to get done, such as making sure that our nuclear weapons are going to work and can be modernized, and so on, and making sure that our whole process is safe.

So, that is again the context, and I think that the chairman's request is absolutely imperative. And I thank you, Mr. Chairman.

Senator **Exon**. Thank you. Can we have an understanding that we will have that by June 1, if you cannot get it done sooner? Is that understood, Mr. Secretary?

Secretary **Herrington**. Yes, sir.

Senator **Exon**. There are some additional questions that we will ask for the record.

ASSISTANT SECRETARY OF DEFENSE

There is just one closing matter. We have no Assistant Secretary for Defense Programs.

Secretary **Herrington**. No, we do not.

Senator **Exon**. Do you intend to nominate someone and have that position filled?

Secretary **Herrington**. Well, we have been interviewing a lot of people for it. It is a difficult position to fill. We have come to no decision on it at this point.

Senator **Exon**. I would think if you could get that filled, it would be very helpful, because while you and this administration are phasing out, this is an ongoing problem and we would like to have somebody in that position, Mr. Secretary, as soon as you can find a qualified individual.

Secretary **Herrington**. I might say that I have great confidence in Troy Wade in the job that he has done as an acting Assistant Secretary. You could not have asked for a finer person from the career staff to be in there. And he has done a heck of a job.

Senator EXON. We think he has done an excellent job also. And we appreciate the help he has been.

With that, Mr. Secretary, I want to thank you for being here this morning, and we want to continue to work with you. You are excused. Please keep in close touch, because we have to work with you on solving these problems.

Myself and others will have questions that we hope you will respond to as soon as possible.

Secretary HERRINGTON. Thank you, Mr. Chairman.

Senator EXON. Thank you. Mr. Wade, we are very pleased to welcome you now. We appreciate your patience.

I will start out by saying that we have your full written testimony, and without objection that will be accepted as part of the record. If you could at this time please summarize that in your own words, and then we will go to questions.

STATEMENT OF TROY E. WADE II, ACTING ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, U.S. DEPARTMENT OF ENERGY, ACCOMPANIED BY DR. ROBERT BARKER, ASSISTANT TO THE SECRETARY OF DEFENSE FOR ATOMIC ENERGY, U.S. DEPARTMENT OF DEFENSE

Mr. WADE. Thank you very much, Mr. Chairman. It will take just a second here to get set up because I want to summarize in viewgraphs for your purpose and the committee's.

And Mr. Chairman, I would like to submit in addition to my statement the classified statements of General Kavanaugh, Ms. Lytle, and Dr. Gilbert.

Senator EXON. Without objection, it is so ordered.

Would you wait for just a moment? [Pause.]

To accommodate the various complicated schedules of the Senators, Mr. Wade, there are some questions for you. About how long do you intend to make your presentation? Ten minutes or what?

Mr. WADE. It is about 10 to 15 minutes, Mr. Chairman.

Senator EXON. Would that accommodate you, Senator?

Senator WIRTH. That will be great.

Senator EXON. I will be glad to recognize you as soon as Mr. Wade has finished his testimony, and then I will reserve any questions that I have or others to later.

Senator WIRTH. You are very kind, Mr. Chairman. I have to chair a meeting at 11 and must be over there a little bit before then.

Senator EXON. Very well. We will proceed then with that understanding. Please proceed, Mr. Wade.

Mr. WADE. Thank you, Mr. Chairman. I have asked Dr. Barker, the Assistant to the Secretary of Defense for Atomic Energy, to join me here at the table, in case there are questions for him later on as well.

DEFENSE PROGRAMS MISSION

Let me begin by reminding you of the mission of defense programs.

DEFENSE PROGRAMS MISSIONS

- SUPPORT NATIONAL SECURITY POLICIES OF THE UNITED STATES FOR A NUCLEAR DETERRENT
- PROVIDE SAFEGUARDS AND SECURITY FOR NUCLEAR WEAPONS, DEVICES, MATERIALS, FACILITIES, AND INFORMATION UNDER DOE CONTROL
- PROVIDE SAFE, HEALTHFUL, AND ENVIRONMENTALLY ACCEPTABLE OPERATIONS OF DOE-OWNED FACILITIES UNDER DEFENSE PROGRAMS CONTROL

First and foremost, we support the nuclear deterrent by developing and maintaining a research development and test capability, producing parts and materials for the weapons which we assemble, producing nuclear materials for the weapons, processing the waste, and also assisting other agencies in determining our adversary's capability and compliance with treaties through our verification and arms control activities.

Overlaying our basic mission are two other very important tenets, safeguards and security, and environment, safety, and health. We must assure that our facilities are as safe and secure as possible.

ACCOMPLISHMENTS

- MEETING DEPARTMENT OF DEFENSE REQUIREMENTS DESPITE:
  - 30-40 YEAR OLD, INCREASINGLY FRAGILE COMPLEX
  - INCREASING REGULATORY PRESSURE
- ADDRESSING SAFETY CONCERNS
  - NATIONAL ACADEMIES REVIEW
  - STRENGTHENING OVERSIGHT FUNCTION
- WORKING THROUGH NUCLEAR WEAPONS COUNCIL
  - FY 1989 BUDGET
  - LONG RANGE REQUIREMENTS

I think we have had a good year, and there have been some rather notable accomplishments in the defense programs complex.

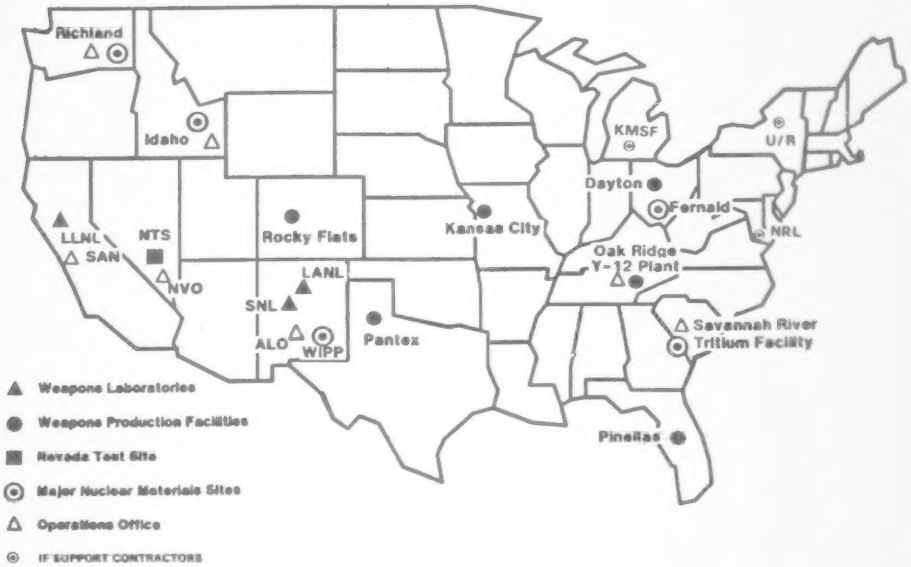
We have met the DOD requirements. We have done so by stretching, as you pointed out in your opening statement, the 30- to 40-year-old complex that we run to the limit. And we certainly do need to make some changes.

We have done many positive things in terms of safety, such as addressing the NAS recommendations in the report that Secretary Herrington asked for. We have utilized the Nuclear Weapons Council this year for the first time.

This subcommittee was, of course, very key in the Blue Ribbon Task Group, and in the establishment of the Nuclear Weapons Council, and it was that forum that we used to hammer out the very difficult budget agreement that we reached with the DOD in January.

FIELD SITES

WEAPONS DEVELOPMENT, TESTING AND PRODUCTION AND NUCLEAR MATERIALS SITES


Richland
Idaho
LLNL
SAN
NTS
NVO
Rocky Flats
LANL
SNL
ALO
WIPP
Pantex
Kansas City
KMSF
Dayton
Fernald
U/R
NRL
Oak Ridge
Y-12 Plant
Savannah River
Tritium Facility
Pinellas
▲ Weapons Laboratories
● Weapons Production Facilities
■ Nevada Test Site
⊙ Major Nuclear Materials Sites
△ Operations Office
⊙ IF SUPPORT CONTRACTORS

This is just a reminder of the size of the complex and the fact that we have facilities ranging from laboratories to production plants to our one test site in Nevada; very geographically dispersed around the United States.

BUDGET REQUEST

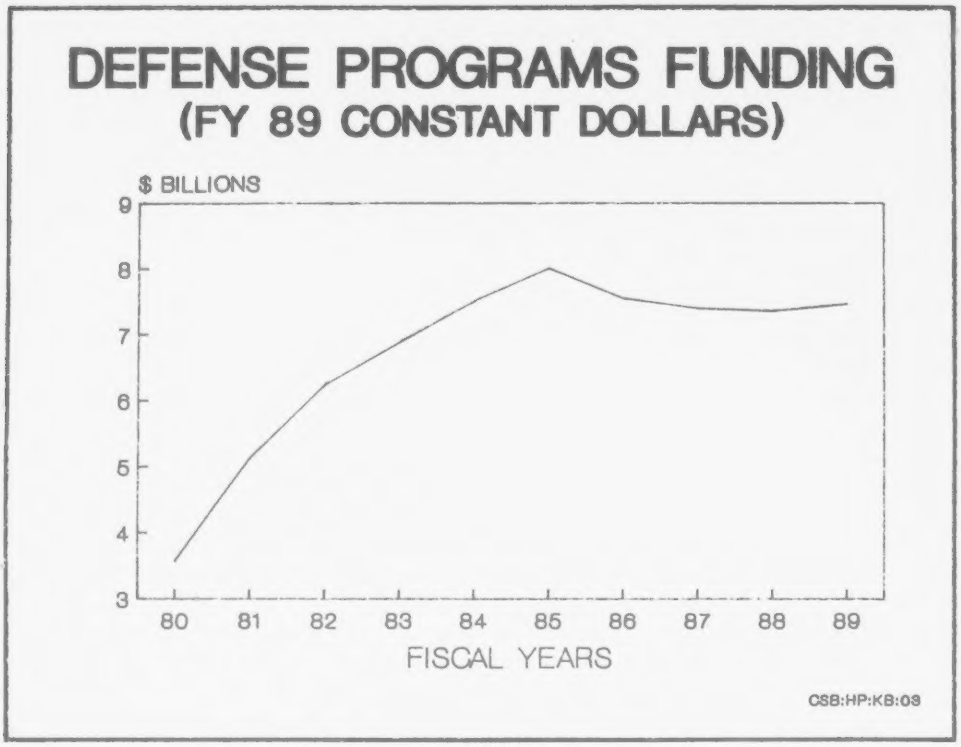
FY 1989 CONGRESSIONAL REQUEST
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
WEAPONS ACTIVITIES	$ 4,163	$ 4,207	$ 4,257
NUCLEAR MATERIALS PRODUCTION	1,848	1,809	2,017
DEFENSE WASTE AND ENVIRONMENTAL RESTORATION	702	895	936
SECURITY AFFAIRS	194	231	260
TOTAL DEFENSE PROGRAMS	$ 6,907	$ 7,142	$ 7,470
		+4.5%	
% OF 050 ACCOUNT	2.4%	2.4%	2.5%

This is a summary of my funding request, Mr. Chairman. The Defense Programs part of the Atomic Energy line is $7.4 billion.

That represents an increase of 4.5 percent over the fiscal year 1988 budget. It will allow us to support the DOD. It will provide upgrades to restore and keep our aging complex running, and we will respond to ES&H commitments.

I would like to point out, however, Mr. Chairman, in light of the discussions that we have had about costs of replacing facilities and costs of cleanup, that my request is only 2.5 percent of the 050 line. So it is a very small part of the total 050 account.



This chart shows our funding history in constant fiscal year 1989 dollars. We peaked in fiscal year 1985, and we have gone down.

We are now about $2 billion below what had been our request to Congress since that date.

Fiscal year 1989 shows a slight increase over inflation. But if this budget holds level as we anticipate, there will have to be additions for all of the new initiatives like the New Production Reactor.

FY 1989 CONGRESSIONAL REQUEST
SIGNIFICANT ELEMENTS

- SUPPORTS DOD NUCLEAR WEAPON REQUIREMENTS
- RESIZES WEAPONS RESEARCH, DEVELOPMENT AND TESTING ACTIVITIES
- MOVES AHEAD WITH NUCLEAR MATERIALS ACQUISITION STRATEGY
- ADDRESSES ES&H CONCERNS
- IMPLEMENTS WASTE DISPOSAL ACTIVITIES
- SUPPORTS ARMS CONTROL INITIATIVES

This request supports the changed DOD nuclear weapons requirements. The request does reduce laboratory manpower in Livermore, Los Alamos, and Sandia by about 350 positions.

It reduces nuclear testing to a level that is of concern to us. It maintains a level of effort funding in the Nuclear-Directed Energy Weapons programs, and in Inertial Fusion.

It does allow us to move ahead with the nuclear materials acquisition strategy that will lead us to the New Production Reactor decision. It supports the SIS project in Idaho, and improved residue recovery programs.

The changing DOD requirements did allow the Secretary to make the decision to place N Reactor in cold standby, so this budget request supports the three operating reactors at Savannah River.

It also supports an increase in arms control initiatives, reflecting our activities on INF, START, and on the nuclear testing verification.

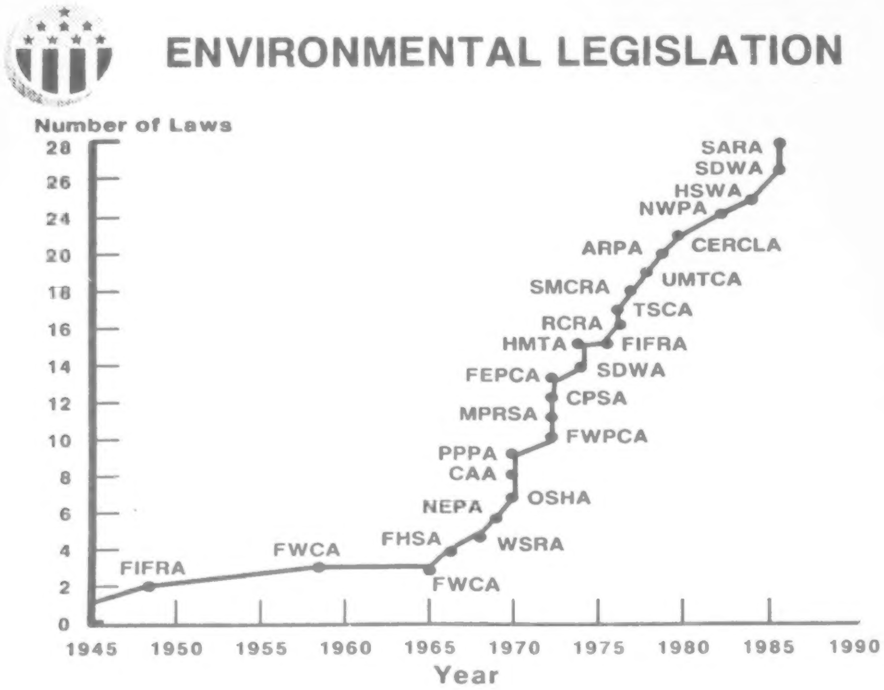
DEFENSE PROGRAMS
SAFEGUARDS AND SECURITY ACTIVITIES
FY 1989 CROSSCUT BUDGET ESTIMATE
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
OPERATING EXPENSE	$ 516	$ 555	$ 581
CAPITAL EQUIPMENT	37	38	37
CONSTRUCTION	104	110	87
TOTAL	$ 657	$ 703	$ 705

SAFEGUARDS AND SECURITY ACTIVITIES

This subcommittee has been aware, and very supportive, of what we had to do in the area of security in years past in the Defense Programs areas.

This reflects the fact that we believe we have now brought the complex into a high state of readiness and compliance in the security area. It has leveled off, and we do not see major increases.



ENVIRONMENT, SAFETY, AND HEALTH ACTIVITIES

This chart, however, shows a slightly different picture. This curve depicts the new environmental regulations that have come on-line in very recent years.

And in order for us to stay in compliance with many of these new regulatory laws, our environment, safety, and health budget has indeed increased dramatically.

PRODUCTION ASSURANCE/ ENVIRONMENTAL SAFETY AND HEALTH FUNDING FY 1989 CROSSCUT BUDGET ESTIMATE ($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
OPERATING EXPENSE	$485	$568	$792
CAPITAL EQUIPMENT	33	38	55
CONSTRUCTION	133	135	173
TOTAL	$651	$741	$1020
ENVIRONMENTAL COMPLIANCE AND PROTECTION	$383	$472	$574
HEALTH AND SAFETY	268	269	446
TOTAL	$651	$741	$1020

Here you see the increase going from $600 million in fiscal year 1987 to over $1 billion in my fiscal year 1989 request, and it is shown here in two ways.

Above the line, the $1 billion figure is shown as operating expense and capital equipment. Below the line it shows the breakdown necessary to stay in environmental compliance.

BUDGET TRENDS ($ IN MILLIONS)

	FY 1985 APPROP. (CONSTANT $'S)	FY 1989 REQUEST	CHANGE
ENVIRONMENT, SAFETY AND HEALTH	$ 581	$1,020	+439 (+76%)
SAFEGUARDS & SECURITY	730	705	- 25 (- 3%)
PROGRAM BASE	6,703	5,745	-958 (-14%)
TOTAL	$8,014	$7,470	-544 (- 7%)

BUDGET TRENDS

This shows budget trends from the high point in fiscal year 1985 appropriations, and shows in constant dollars the fact that the environment, safety, and health budget of Defense Programs has gone up 76 percent. Safeguards and Security is down 3 percent.

The program base, however, is down over 14 percent, with the total being a reduction of about 7 percent. So we have had to accommodate these increased environment, safety, and compliance numbers by taking it out of the program base.

COMPLEX STATUS

	1985	1989
REACTORS	5 @ FULL POWER	3 @ 50% POWER
MATERIAL PRODUCED	100%	40% OF 1985
NEW WEAPONS DELIVERIES	100%	60% OF 1985
TESTING	100%	71% OF 1985
LAB EMPLOYMENT (WEAPONS RD&T)	11,200	10,250

Here in an unclassified summary are some examples of that. We have gone from five reactors at full power to three reactors at 50 percent power.

We are producing 40 percent of the material that we produced in 1985, 60 percent of the weapons deliveries that we delivered in 1985. We are at about 71 percent of the tests that we had in 1985, and so on. Laboratory employment has gone down as well.

CURRENT AGENDA

- o DEVELOPING MODERNIZATION PLAN
- o PROCEEDING WITH NEW PRODUCTION REACTOR ACQUISITION
- o SUPPORTING DEPLOYMENT OF SPECIAL ISOTOPE SEPARATION TECHNOLOGY
- o UPGRADE COMPLEX FOR REGULATORY/SAFETY NEEDS
- o SUPPORT ARMS CONTROL INITIATIVES
- o TECHNOLOGY TRANSFER

CURRENT DEFENSE PROGRAMS AGENDA

Our current agenda and the number one priority of Defense Programs this year is the modernization plan requested by Congress.

I will elaborate on that. The modernization plan will take into account long-term DOD requirements and will include other new initiatives over and above the New Production Reactor, which is already underway, and the SIS, which is underway.

This budget does support the upgrades necessary to sustain compliance. It supports arms control initiatives and it supports a new technology transfer initiative within Defense Programs.

MODERNIZATION OF NUCLEAR WEAPONS COMPLEX

- 20-YEAR STOCKPILE REQUIREMENTS FROM DOD
- CAPACITY LIMITED WITH EXCURSIONS
- COMPLEX RESIZING AND CONSOLIDATION
    - NEW FACILITIES -- FULL ENVIRONMENTAL COMPLIANCE
    - EXISTING FACILITIES -- IMPROVE SAFETY AND ENVIRONMENT
    - OLD SITES -- CLEAN UP
- DEFINE R&D BASE
- PLAN, SCHEDULE AND COSTS

With regard to the modernization study itself, we, through the Nuclear Weapons Council, through Dr. Barker, will try to look at 20-year stockpile requirements from the DOD.

There will be stockpile option cases, a base case, a case that reflects START, the effect of strategic arms reductions, and we will look at the number of new builds per year, and the mix of the weapons types.

We will look at total weapons in the stockpile. We will look at how our capacity can be limited. And we will look at the complex resizing. What new facilities do we need? Do we need to be as geographically diverse as we once were? And so on.

The new facilities that we depict in this study will be in full environmental compliance when they are on-line. They will have the latest state-of-the-art safety and meet all environmental standards.

MAJOR FACILITY INITIATIVES

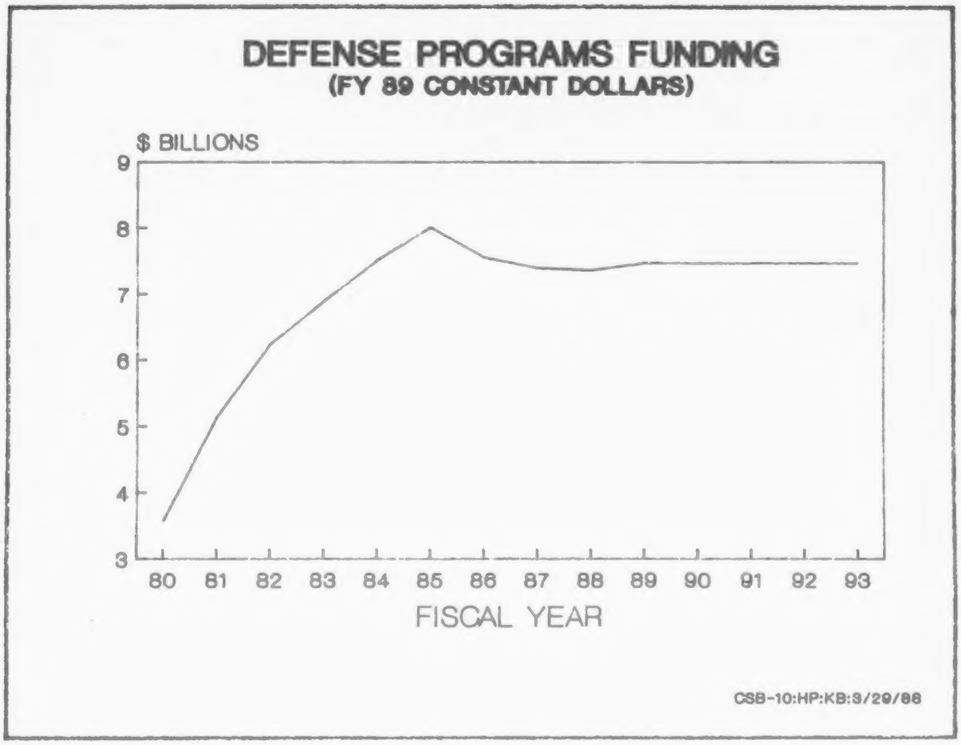
	LINE ITEM COST ($ IN MILLIONS)
WASTE ISOLATION PILOT PLANT (NEW MEXICO)	$ 413
DEFENSE WASTE PROCESSING FACILITY (SAVANNAH RIVER)	930
FUEL PROCESSING RESTORATION (IDAHO)	284
FERNALD ENVIRONMENTAL UPGRADE (FEED MATERIALS PRODUCTION CENTER)	155
SPECIAL NUCLEAR MATERIAL LABORATORY (LOS ALAMOS NATIONAL LABORATORY)	210
SPECIAL ISOTOPE SEPARATION (IDAHO)	550
NEW PRODUCTION REACTOR (TBD)	3,000-5,000
BUILDING 371 UPGRADE (ROCKY FLATS)	370
HANFORD WASTE VITRIFICATION FACILITY (HANFORD)	920

The old sites that we will be cleaning up will be in the report that we give to you in December.

I would like to point out to you, Mr. Chairman, that with the support of this subcommittee we have not been standing idle. Depicted on this chart are the major facility initiatives that are now underway.

The Waste Isolation Pilot Plant will come on-line in Carlsbad, New Mexico this fall. We will begin to ship waste this fall. The Defense Waste Processing Facility at Savannah River is in its final stages and we will bring that facility on-line in 1990.

Similar examples here show that in fact we have been investing major dollars in major facilities over the years. The New Production Reactor, still to come, will be a major item somewhere between $3 billion and $5 billion.



OUTYEAR FUNDING PROFILE

This is just an example of our current funding profile projected to the year 1993. If we look at just the same kind of growth that the DOD anticipates, 2.7 percent, we clearly cannot accommodate new facilities that the modernization study will require in that line. So we are going to need some help.

SUMMARY

- THE BUDGET SUMMIT AGREEMENT SIGNIFICANTLY CONSTRAINED THE NATIONAL DEFENSE ACCOUNT INCLUDING DOE DEFENSE ACTIVITIES
- DEPARTMENT OF DEFENSE REQUIREMENTS WERE REDUCED ALLOWING N REACTOR TO BE PLACED IN COLD STANDBY
- NEW PRODUCTION REACTOR CAPACITY IS URGENTLY NEEDED
- RESTORATION OF COMPLEX AND ES&H WILL CONTINUE AS HIGH PRIORITY
- MODERNIZATION STUDY WILL CHART COURSE FOR FUTURE

In summary, as a result of the budget summit, the fiscal year 1989 request significantly constrained their activities and my activities as well. The requirements were reduced. We placed N Reactor into cold standby. We will meet the other DOD requirements.

It is very clear that the New Production Reactor capacity is urgently needed. It is very clear that the restoration of the complex, and the environment, safety, and health activities are going to be a very high and very expensive priority.

We are very hopeful that the modernization study, the road map, will chart the proper course for the future, both in terms of what we need in facilities and what we are going to need to tell the U.S. taxpayer.

Mr. Chairman, that concludes my brief summary. I would be pleased to address questions.

[The prepared statements of Mr. Wade, Mr. Kavanaugh, Ms. Lytle, and Mr. Gilbert follow:]

STATEMENT OF
TROY E. WADE, II
ACTING ASSISTANT SECRETARY FOR DEFENSE PROGRAMS
U.S. DEPARTMENT OF ENERGY

INTRODUCTION

Mr. Chairman and Members of the Committee, I am pleased to appear before you in support of the Department of Energy's (DOE) Atomic Energy Defense Activities authorization request of $8.1 billion for FY 1989. This request includes $630 million for the Naval Reactors program which will be discussed later by Admiral McKee. I am accompanied today by the Deputy Assistant Secretary for Planning and Resource Management, Jim Culpepper; the Deputy Assistant Secretary for Military Application, Brigadier General Paul Kavanaugh; the Acting Deputy Assistant Secretary for Nuclear Materials, Jill Lytle; and the Acting Deputy Assistant Secretary for Security Affairs, Charles Gilbert. General Kavanaugh, Ms. Lytle, and Mr. Gilbert have statements on their respective programs that I would like to submit for the record. Also here today is Dr. Robert Barker, from the Department of Defense, who will provide an overview of the DOD perspective following my presentation.

MISSION

For the Department of Energy and Secretary Herrington, I am responsible for three broad missions (Chart 1). First and foremost is our mission to support the national security policies of the United States for an effective nuclear deterrent. A variety of programs are incorporated in that envelope; developing and maintaining a research, development, and testing capability; producing and maintaining parts and nuclear materials for the weapons that make up our nuclear stockpile; processing waste generated from those efforts; and assisting other agencies in determining our adversaries' capabilities and compliance with treaties through verification and arms control activities.

Overlaying our primary mission are two other crucial mission-related areas. First, we must assure that all of our facilities, materials, technology, and information are as safe and secure as possible. We routinely test our complex on an independent basis to verify its ability to withstand credible security threats.

Second, we have a major commitment to assure that our operations function in a safe, healthful, and environmentally acceptable manner. Our expanding programs in this area, together with increased oversight by the Department through the technical safety appraisal process and other reviews, will assure that Defense Programs activities continue to maintain their exceptional safety record and meet the evolving environmental regulations.

DEFENSE PROGRAMS MISSIONS

- SUPPORT NATIONAL SECURITY POLICIES OF THE UNITED STATES FOR A NUCLEAR DETERRENT
- PROVIDE SAFEGUARDS AND SECURITY FOR NUCLEAR WEAPONS, DEVICES, MATERIALS, FACILITIES, AND INFORMATION UNDER DOE CONTROL
- PROVIDE SAFE, HEALTHFUL, AND ENVIRONMENTALLY ACCEPTABLE OPERATIONS OF DOE-OWNED FACILITIES UNDER DEFENSE PROGRAMS CONTROL

CHART 1

ACCOMPLISHMENTS

The challenges and problems we have faced are significant. We are stretched to the limits by operating a 30-40 year old complex which is receiving increasingly strong regulatory pressures. We feel we are doing a good job of meeting Department of Defense requirements with our increasingly fragile complex. We are also making positive efforts to assure safety of our operations. In response to the Chernobyl accident, Secretary Herrington engaged the National Academies of Science and Engineering (NAS/NAE) to review our Class A reactors. That report was provided in October 1987, and we are addressing the concerns specified in the report. Of particular relevance are the conclusions and recommendations described under the "Technological Vigilance" issue in the NAS/NAE Report. The Department's production reactor operating contractors are undertaking aggressive programs to enhance the technical competence and capability devoted to the reactors as well as the experimental and analytical base to support reactor safety. The Department is also evaluating the actions needed to strengthen its in-house technical capability to manage the safety of its production reactors in addition to strengthening its separate oversight function. We have an increase of $88 million in the FY 1989 budget to address the requirements of the NAS and other reviews, e.g., technical safety appraisals.

WHERE WE ARE TODAY

Since July 1987, when I was named Acting Assistant Secretary for Defense Programs, I have recognized the need to plan and conduct the Department's defense activities in an environment of budget constraints. Our FY 1989 requirements were arrived at only after lengthy discussion and negotiation with the Department of Defense through our joint coordinating body, the Nuclear Weapons Council. We were particularly challenged over the past several months by the fact that the budget summit required a specific ceiling of $299.5 billion in budget authority for the National Defense function account (050) in FY 1989. That agreement required the Departments of Energy and Defense to work very closely in establishing our joint priorities and balancing our respective program and funding requirements.

Specifically, because of budget constraints, there has been a significant reduction in the weapons to be built over the next several years and that will allow us to conduct our program within these constraints. We are placing the N Reactor at the Hanford Site in cold standby. We can meet the requirements of the Department of Defense through recycle of material from retirements, reprocessing existing inventories, and the operation of the three remaining reactors at Savannah River.

WHERE WE WILL BE TOMORROW

We are also looking to the future with this budget request. We are developing as requested by the Congress, a Modernization Plan to be completed by December 1988. The findings of this study, which will take into account the Department of Defense requirements in support of nuclear deterrence, will be the basis for strategic planning on the appropriate capability and capacity of the Defense Programs complex.

In the interim and prior to the Plan, we need to move ahead. We have included funding for a New Production Reactor to provide an assured supply of tritium in the late 1998-1999 time period and beyond. In FY 1988, we plan to select the preferred technology and site through a series of reviews culminating in a evaluation by the Department's Energy System Acquisition Advisory Board. We would then begin the environmental impact statement (EIS). In FY 1989, we plan to continue the EIS which will result in final selection of both the technology and the site. We are continuing efforts to support deployment of the Special Isotope Separation technology, which will provide us with a reactor-independent supply of plutonium in 1995. We will be completing the environmental impact statement on SIS this year, and construction will begin in FY 1989. We have also included the required funding to continue to upgrade our complex both to meet mission requirements as well as regulatory and safety needs. I will speak to that in detail later.

ARMS CONTROL

We are involved in arms control policy in two important ways. First, we participate actively in policy deliberations. On nuclear test issues, our expertise is particularly needed, given the pivotal role DOE plays in the design, testing, and production of nuclear weapons. Second, and integrally related to the position we take, are our verification technology development and analytical support roles. Specifically, our role is to ensure that treaties negotiated are within the constraints imposed by current limits of verification technology. Similarly, we seek to develop new verification technologies to support various provisions proposed by negotiation parties and envisioned for future arms control efforts.

As you know, the Administration has successfully negotiated an agreement with the Soviets concerning intermediate-range nuclear forces and is actively engaged in Strategic Arms Reduction Talks (START). We are committed to supporting the Intermediate-Range Nuclear Forces (INF) Treaty and providing the basis for verification agreements necessary to allow further arms reduction initiatives to be undertaken.

Currently, the U.S. is negotiating with the Soviets to refine the verification measures of the Threshold Test Ban and Peaceful Nuclear Explosions Treaties signed in 1974 and 1976 and awaiting ratification. To this end, U.S. and Soviet scientists recently concluded reciprocal visits to the Semipalatinsk and Nevada Test Sites. Joint verification experiments are planned for these sites in FY 1988. A reprogramming request has been sent to Congress to support these experiments as well as INF and START verification technology requirements.

Within the context of arms control agreements, DOE will be called upon to maximize the capability and reliability of the nuclear weapons stockpile which is determined to be essential for national security. Arms control will hopefully lead to greater stability; however, the DOE weapons program must remain strong to achieve and maintain nuclear weapons deterrence within the context of any agreements.

FUNDING REQUEST

Our program activities are carried out in a large and very complex network of production and laboratory facilities spread across the Nation (Chart 2).

WEAPONS DEVELOPMENT, TESTING AND PRODUCTION AND NUCLEAR MATERIALS SITES

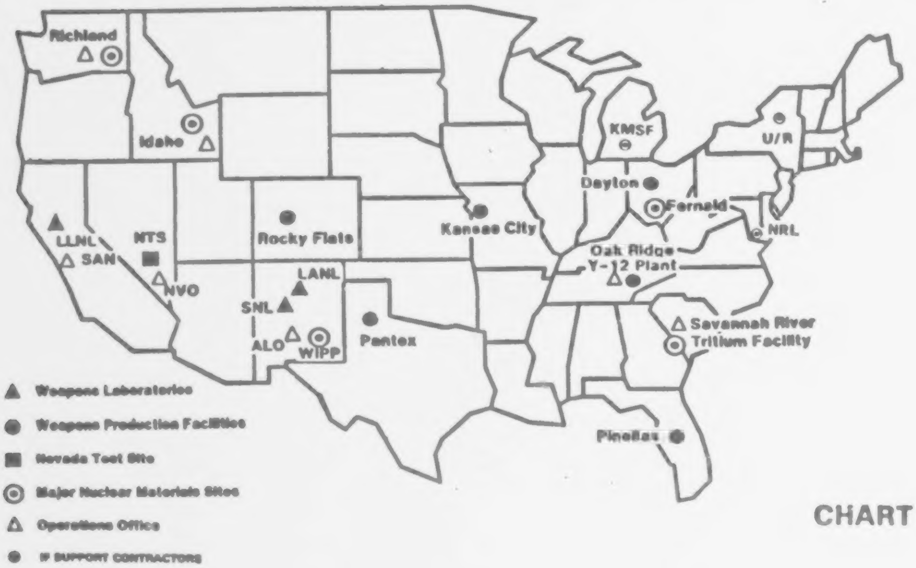

Richland
Idaho
KMSF
U/R
Dayton
Fernald
NRL
LLNL
SAN
NTS
NVO
Rocky Flats
Kansas City
Oak Ridge
Y-12 Plant
LANL
SNL
ALO
WIPP
Pantex
Savannah River
Tritium Facility
Pinellas
▲ Weapons Laboratories
● Weapons Production Facilities
■ Nevada Test Site
◎ Major Nuclear Materials Sites
△ Operations Office
● IF SUPPORT CONTRACTORS

CHART 2

Shown here are our key locations including our weapons laboratories at Sandia, Los Alamos, and Livermore; our weapons production facilities at Rocky Flats, Kansas City, Oak Ridge, Pantex, Dayton, and Pinellas; our test site in Nevada; our principal nuclear materials sites at Savannah River, Richland, and Idaho; our DOE operations offices at locations consistent with these facilities; and our inertial fusion support contractors. I have a very capable management and support staff in Headquarters and in the field to direct the operation of this complex. Together, we are responsible for assuring that the nuclear weapons complex has sufficient operational capacity and capability to support national defense objectives. The weapons laboratory directors will be available tomorrow to provide their perspective and plans to support Defense Programs' objectives.

The total budget request (Chart 3) to support these activities will:

- Meet the weapons production and nuclear materials requirements as agreed to with the Department of Defense;
- Continue our efforts to restore, revitalize, and properly maintain aging DOE facilities;
- Provide a research, development, and testing program in support of our nuclear weapons stockpile requirements;
- Continue our commitment to meet environment, safety, and health, and essential safeguards and security needs; and

- Ensure progress in our effort to improve management of our radioactive and hazardous wastes.

FY 1989 CONGRESSIONAL REQUEST
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
WEAPONS ACTIVITIES	$ 4,163	$ 4,207	$ 4,257
NUCLEAR MATERIALS PRODUCTION	1,848	1,809	2,017
DEFENSE WASTE AND ENVIRONMENTAL RESTORATION	702	895	936
SECURITY AFFAIRS	194	231	260
TOTAL DEFENSE PROGRAMS	$ 6,907	$ 7,142	$ 7,470
			+5%

CHART 3

We are requesting a funding level of $7.5 billion for Defense Programs. This allows an increase of $328 million, or approximately 5 percent over FY 1988. As mentioned earlier, this represents our share of the overall National Security Account ceiling of $299.5 billion. This increase (Chart 4) goes primarily to New Production Reactor support, implementation of National Academy of Science recommendations, increased environmental activities, facility upgrades, increased support for INF/START verification requirements, and the cost of continuing to do business.

SUMMARY OF FY 1989 INCREASES
($ IN MILLIONS)

FY 1988 CONGRESSIONAL BUDGET		$7,142
o NEW PRODUCTION REACTOR	+ 40	
o NAS/OTHER RECOMMENDATIONS	+ 88	
o WIPP-RELATED ROAD CONSTRUCTION	+ 43	
o INCREASED ENVIRONMENTAL RESTORATION SUPPORT	+ 20	
o BUILDING 371 UPGRADE	+ 18	
o HANFORD WASTE VITRIFICATION PLANT	+ 15	
o INF/START VERIFICATION SUPPORT	+ 10	
o REDUCED WEAPONS LABORATORY CORE FTE'S	- 26	
o OTHER REDUCTIONS (PRIMARILY PRIOR YEAR DEOBLS.)	- 67	
o ESCALATION (OPERATING, EQUIPMENT, GPP)	+ 187	
TOTAL INCREASE		+328
FY 1989 CONGRESSIONAL REQUEST		$7,470

CHART 4

Weapons Research, Development, and Testing

In the Weapons Research, Development, and Testing (RD&T) program (Chart 5), we will support the Department of Defense requirements for new systems, and maintain the technology base to support both the current stockpile and the stockpile of the future. There is a reduction, about 5 percent, in our core laboratory RD&T employment (Chart 6), but we will maintain the FY 1988 level

WEAPONS RESEARCH, DEVELOPMENT AND TESTING (RD&T)
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
CORE RD&T	$ 1,377	$1,467	$1,465
NUCLEAR DIRECTED ENERGY WEAPONS	317	279	285
INERTIAL FUSION	152	159	164
TOTAL	$ 1,846	$ 1,905	$ 1,914

CHART 5

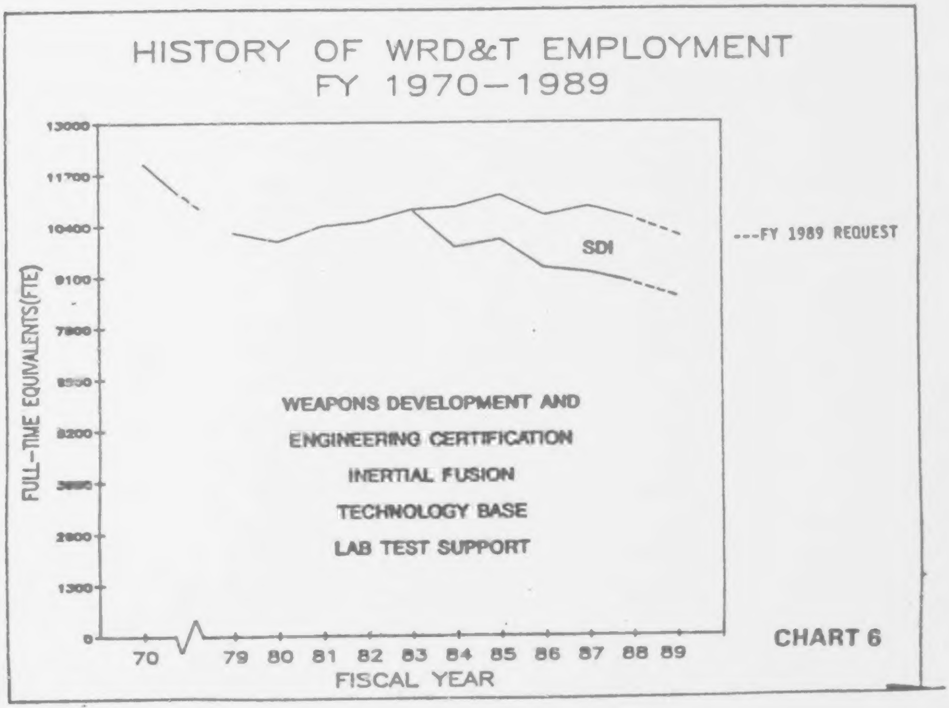


CHART 6

of effort for our Nuclear-Directed Energy Weapons and Inertial Fusion programs.

Our Nuclear-Directed Energy Weapons program will continue to define the threat to proposed non-nuclear strategic defense initiative (SDI) architectures; to determine the threat to the current nuclear deterrent; and to determine the feasibility of nuclear directed energy weapons as an SDI option, if necessary. With the funding requested, we expect to provide the Department of Defense with an assessment of technical feasibility of several nuclear-directed energy concepts, such as X-ray laser, hypervelocity pellets, and optical frequency laser. The Inertial Fusion program continues to explore the ability to simulate certain nuclear weapons explosive processes and to enhance our predictive capability. The capabilities of our nuclear weapons laboratories are being supplemented by three major contractors: KMS Fusion, Inc.; the University of Rochester; and the Naval Research Laboratory. Chart 7 shows the OMEGA laser at the University of Rochester--the principal direct-drive inertial fusion facility in the United States. [CHART 7 DELETED]

An integral component of the research and development program is our testing activity. We must continue to test in order to support research to avoid technological surprise, conduct development programs for new weapons to address changing threats, and to maintain our existing weapons stockpile. We are showing a slight reduction in our weapons testing (Chart 8) as compared to prior years. However, our position is that we must sustain a testing level necessary to assure that the current and future nuclear weapons stockpile continues to be a reliable and an effective nuclear deterrent.

NUCLEAR TESTING TRENDS
DOE TESTS

[CLASSIFIED CHART DELETED]

CHART 8

Weapons Production and Surveillance

The Weapons Production and Surveillance program supports the fabrication and assembly of nuclear weapons and weapon components, and stockpile maintenance and reliability assessment. The weapons produced and retired in FY 1989 and the infrastructure supported for weapons builds in the outyears is consistent with our agreement with the Department of Defense. Six different weapons systems (Chart 9) will be delivered or modified in FY 1989. The systems scheduled for retirement will yield sizable amounts of plutonium for use in new production, particularly the Poseidon which is programmed to retire. All of these actions, taken in this era of budget constraint, will allow us to conduct defense programs within a resized complex.

WEAPONS IN PRODUCTION
FY 1989

B61 BOMBS

W80-0 SEA LAUNCHED CRUISE MISSILE WARHEAD

W80-1 AIR LAUNCHED CRUISE MISSILE WARHEAD

B83 BOMB

W87 PEACEKEEPER (MX) WARHEAD

W88 TRIDENT II WARHEAD

CHART 9

We are strongly committed to continuing the long-term priority effort to maintain and modernize our production plants. This complex of aging production facilities and assembly plants is faced with severe production pressures trying to meet operational schedules. Our budget (Chart 10) will support the production of weapons and most urgent restoration and maintenance activities. We must ensure our facilities have the capability and capacity to meet production schedules, and in doing so, operate in a safe, secure and environmentally acceptable manner. The budget request includes a new initiative to upgrade Building 371 (Chart 11) at our Rocky Flats Plant.

WEAPONS PRODUCTION AND SURVEILLANCE
FY 1989 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
DECISION COSTS	$ 508	$ 510	$ 531
PRODUCTION BASE	1,739	1,718	1,730
TOTAL	$2,247	$2,228	$2,261

CHART 10

[CHART 11 DELETED]

Building 371 was built as a replacement to the aging plutonium recovery facilities at Rocky Flats and has failed to operate as intended and requires extensive modification. Building 371 is a fully hardened facility and is capable of meeting all current environment, safety and health; and safeguards and security criteria. The upgrade will provide a safe, efficient, and economic recovery capability for plutonium from weapon returns and production residues. Numerous studies have shown this course of action to be the most logical, cost effective method to providing a replacement to plutonium recovery operations at Rocky Flats.

Nuclear Materials Production

As mentioned earlier, we are placing N Reactor in cold standby because of budget constraints which led to revised production requirements from the Department of Defense. N Reactor has operated since 1963, producing plutonium for both defense and reactor research and development purposes, as well as byproduct steam for the generation of electricity. This reactor has played a key role in meeting the requirements for plutonium. However, the reduced requirements now forecast by the Department of Defense can be met by our Savannah River reactors and by recycling retired nuclear weapons and residue material. Placing N Reactor in cold standby is the most prudent response to these changes. We will, however, complete those parts of the N Reactor safety enhancement program that would have been required for restart and power operation prior to placing it in standby. This will make its output available should it be necessary in the future. As a contingency in the near term, we have a plan to accelerate the processing of plutonium residues to provide the necessary material should it be required. This gives us a relatively inexpensive option to obtain additional material (Chart 12).

NUCLEAR MATERIALS

ABILITY TO MEET PLUTONIUM REQUIREMENTS

CHART 12

Our FY 1989 request (Chart 13) will provide the nuclear materials required in the near term and the capability to produce the material required to meet DOD plans in the long term. However, due to the fragility of our facilities, we are concerned about our ability to continue to produce nuclear materials in the near term. To address safety concerns, we have provided for a significant infusion of resources to respond to the National Academy of Sciences and other recommendations. Our request will provide improvements in the areas of emergency planning, aging, backfitting, training, incident analysis and trending, probabilistic risk assessment, severe accidents, maintenance, and plant modernization. Resolution of these concerns should increase the public's confidence in our ability to operate our facilities in a safe manner.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
MAJOR ACTIVITIES
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
BASE PROGRAM	$1,188.1	$1,080.7	$1,075.7
ENVIRONMENTAL, SAFETY AND HEALTH	272.2	301.8	434.6
SAFEGUARDS AND SECURITY	151.6	168.9	176.1
NEW PRODUCTION REACTOR	0	20.0	60.0
SPECIAL ISOTOPE SEPARATION	73.9	95.8	101.4
NAVAL REACTOR SUPPORT	162.4	141.5	169.0
TOTAL	$1,848.2	$1,808.7	$2,016.8

CHART 13

Our work on a New Production Reactor and the Special Isotope Separation project will provide the necessary capability and flexibility to meet our long-term needs. In FY 1988, we will begin the necessary studies leading to initiation of an environmental impact statement for the New Production Reactor. The Department has asked the Energy Research Advisory Board to evaluate alternative reactor technologies. Also, a Site Evaluation Team has been established to evaluate alternative sites. The findings of both groups will be completed in FY 1988 and a preferred reactor technology and site selected. The funding requested in FY 1989 will permit the EIS to continue since this activity could be the critical path in placing a New Production Reactor on-line on an urgent schedule.

With regard to the Special Isotope Separation project, we expect to complete the environmental impact statement Record of Decision this year. This will allow facility construction to start in FY 1989, along with the initiation of major long-lead procurements.

Defense Waste and Environmental Restoration

We continue to support the efforts to safely store and dispose of radioactive and hazardous wastes. Our funding request for FY 1989 (Chart 14) recognizes the transition from storage at various locations to disposal operations. To demonstrate disposal of transuranic waste, the Waste Isolation Pilot Plant

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
MAJOR ACTIVITIES
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
BASE PROGRAM	$437.7	$487.3	$512.9
DEFENSE WASTE PROCESSING FACILITY	186.6	217.0	210.1
WASTE ISOLATION PILOT PLANT	23.4	85.7	113.1
HANFORD WASTE VITRIFICATION PLANT	0	7.5	22.5
ENVIRONMENTAL RESTORATION	53.8	97.8	120.9
SUBTOTAL	701.5	895.3	979.5
PRIOR YEAR DEOBLIGATION/ADJUSTMENTS	-	-	-43.0
TOTAL	$701.5	$895.3	$936.5

CHART 14

near Carlsbad, New Mexico (Chart 15), comes on-line in FY 1989. Treatment of high-level waste for disposal in a geologic repository is the function of the Defense Waste Processing Facility (Chart 16) at the Savannah River Plant. This facility completes its year of preoperational checkout, with operation planned for late FY 1990. These actions constitute critical early elements of our Defense Waste Management Plan. We also are focusing on the next phase of the plan with our increased funding for a high-level waste immobilization facility for the Hanford Reservation. This facility will demonstrate the Administration's commitment to prepare high-level waste at Hanford for disposal. [CHARTS 15 & 16 DELETED]

Eventually, defense high-level waste is to be disposed of in the geologic repository being developed under the Nuclear Waste Policy Act. We are now developing a Memorandum of Understanding with the Office of Civilian Radioactive Waste Management which will address the arrangements for the disposal of defense high-level waste.

As you are aware, we consolidated management of all Defense Programs environmental remedial actions (Chart 17) for inactive hazardous and radioactive waste sites and facilities under the Defense Waste and Environmental Restoration Program in FY 1988. The objectives of this program are to identify, characterize and restore these sites and facilities in order to ensure compliance with applicable laws and regulations. We are regulated in this area by the Environmental Protection Agency and the States. Many remedial actions have been incorporated into strict compliance schedules through either the Resource Conservation and Recovery Act (RCRA) permitting process or through consent orders and compliance agreements with the Environmental Protection Agency and State regulators. Cleanup of the balance of the inactive sites must be performed under the requirements of the Comprehensive Environmental Response, Conservation, and Liability Act (CERCLA). We have increased this funding by about 24 percent in FY 1989 to address our responsibilities to clean up contamination from past activities.

[CHART 17 DELETED]

Security Affairs

Our overall Security Affairs program plays an extremely critical role in fulfilling our national security mission. Activities include preventing theft or sabotage of nuclear weapons, materials, facilities, and the compromise of classified information; providing nuclear weapons expertise to the Intelligence Community; controlling the export of nuclear materials technology and equipment; providing technology necessary to monitor treaty compliance; and providing technical and analytical support for DOE's role in arms control negotiations, policy formulation, and implementation. These activities are grouped into Verification and Control Technology, Security Investigations, and Nuclear Safeguard and Security categories for budget purposes (Chart 18).

SECURITY AFFAIRS
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
VERIFICATION & CONTROL TECHNOLOGY	$ 97	$ 121	$ 140
SECURITY INVESTIGATIONS	33	32	40
NUCLEAR SAFEGUARDS & SECURITY	64	78	80
TOTAL	$ 194	$ 231	$ 260

CHART 18

Our Verification and Control Technology program addresses specifically the areas of treaty verification, intelligence, arms control, and control of sensitive technology (Chart 19). Our budget request provides increased emphasis on the fabrication, demonstration, and deployment of both research and operational verification systems. As discussed earlier, we must increase our efforts to support expected verification requirements resulting from INF/START.

[CLASSIFIED CHART DELETED]

CHART 19

With regard to Security Investigations, our request reflects our commitment to a multi-year initiative to reduce our backlog of overdue security reinvestigations. During FY 1987, the Office of Personnel Management, which does most of our investigations, did not make a significant reduction in the backlog of reinvestigations. However, through hiring of additional investigators in FY 1988 and the availability of carryover funds, we expect to have about 20,000 reinvestigations conducted in FY 1988 and FY 1989. We feel this effort is critical to assuring our personnel meet our high security standards.

OUR COMMITMENT TO SAFEGUARDS AND SECURITY

We have improved the Department's safeguards and security posture. The safeguards and security research and development program has played an important role in this accomplishment. Our request continues to ensure adequate protection of the DOE's nuclear weapons, nuclear materials, facilities, and classified information against terrorism, theft, and compromise (Chart 20). Our Defense Programs-wide budget for Safeguards and Security activities (Chart 21) indicates that funding has leveled off indicating we have defined and adequately funded our critical security improvements. [CHART 20 DELETED]

DEFENSE PROGRAMS
SAFEGUARDS AND SECURITY ACTIVITIES
FY 1989 CROSSCUT BUDGET ESTIMATE
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
OPERATING EXPENSE	$ 516	$ 555	$ 581
CAPITAL EQUIPMENT	37	38	37
CONSTRUCTION	104	110	87
TOTAL	$ 657	$ 703	$ 705

CHART 21

OUR COMMITMENT TO PRODUCTION ASSURANCE/ENVIRONMENT, SAFETY, AND HEALTH (PA/ES&H)

Applicable portions of the programs I have discussed today are each included in this Defense Programs-wide overall activity. We are just beginning to address the PA/ES&H needs of an aging complex. Significant resources will be required for the foreseeable future to modernize and replace these fragile production facilities. Inadequate funding for essential environmental, safety, and health requirements can result in enforcement actions by

Federal/State regulators and a potential for curtailment of operations, thus impacting our ability to assure our production. Consistent with Secretary Herrington's plans to strengthen the Department's PA/ES&H program, we are developing a comprehensive long-range plan for Defense Programs to better define the scope and cost of our existing and potential PA/ES&H problems; but we know it is going to be an expensive process. For example, we have estimated that our total PA/ES&H funding level (Chart 22) will be be about $1 billion in FY 1989 - that is up about 40 percent from FY 1988 and represents about 15 percent of our total FY 1989 request.

PRODUCTION ASSURANCE/
ENVIRONMENTAL SAFETY AND HEALTH FUNDING
FY 1989 CROSSCUT BUDGET ESTIMATE
($ IN MILLIONS)

	FY 1987	FY 1988	FY 1989 REQUEST
OPERATING EXPENSE	$485	$568	$792
CAPITAL EQUIPMENT	33	38	55
CONSTRUCTION	133	135	173
TOTAL	$651	$741	$1020
ENVIRONMENTAL COMPLIANCE AND PROTECTION	$383	$472	$574
HEALTH AND SAFETY	268	269	446
TOTAL	$651	$741	$1020

CHART 22

The Effluent Treatment Facility at Savannah River (Chart 23) is just one example of the kinds of improvements we are making at our sites. This project will cost $50 million, is mandated by the 1986 Amendment to RCRA and must be operational by November 1988. We are on schedule. I can assure you that we will continue to put forth our very best efforts to meet PA/ES&H requirements in order to assure our production objectives can be met. With your help, we will comply with ES&H laws and regulations while meeting national security objectives. [CHART 23 DELETED]

CLOSING REMARKS

I personally want to thank you for your support over the past year. It has been a significant factor in the successful execution of our responsibilities. With your continued support and leadership, we will continue to provide this Nation with a viable nuclear deterrent capability. I look forward to working with you and your staff in the coming year, and I will keep the Committee fully and currently informed of our progress. I urge your approval of our request, so we may work together toward our common objectives. I will be pleased to answer any questions you may have.

STATEMENT OF
PAUL F. KAVANAUGH
BRIGADIER GENERAL, U.S. ARMY
DEPUTY ASSISTANT SECRETARY FOR MILITARY APPLICATION

Mr. Chairman, members of the committee, it is a pleasure to appear before you to testify in support of the Department of Energy (DOE) Atomic Energy Defense Activities Authorization request for fiscal year (FY) 1989.

INTRODUCTION

1. THE DOE MISSION AND U.S. NATIONAL SECURITY STRATEGY

Our national security strategy is designed to protect U.S. basic freedoms, and avoid international war and coercion through nuclear deterrence. The national security strategy postulates movement toward strategic defense in balance with offensive systems; movement toward bilateral, verifiable reductions in nuclear arms; consideration of less reliance on underground nuclear testing on a technically justified basis.

In support of this strategy, DOE is charged with the mission of developing and maintaining nuclear warheads for the Nation's nuclear deterrent forces. A viable nuclear deterrent must include a credible deployed weapons stockpile and a robust research, development and testing program to develop and modernize tomorrow's nuclear stockpile for as long as we have a nuclear deterrence policy. That stockpile must be configured to respond to future advanced technologies, both nuclear and nonnuclear. It must respond to and anticipate changes in adversary offensive and defensive target sets, and advances in weapons and delivery systems affecting the effectiveness, survivability and/or vulnerability of our existing and future nuclear deterrent forces. DOE must also respond to nuclear weapon stockpile modernization for safety, security, and use control in conjunction with military requirements.

Providing the Nation with a credible nuclear deterrent also involves avoiding technological surprise. A key component of this includes supporting the President's Strategic Defense Initiative. Strategic defense research related to nuclear directed energy is necessary to understand the Soviet counter-defensive capabilities against both a future U.S. strategic defense system and our existing retaliatory nuclear deterrent as well. It is also important to understand nuclear directed energy weapons as a U.S. strategic defense option, if needed.

2. CONTINUING REQUIREMENT FOR NUCLEAR DETERRENCE AND THE NECESSARY PROGRAM RESPONSES TO MEET EVOLVING NATIONAL DEFENSE POLICY ISSUES

The theme that I will stress throughout my testimony is the continuing requirement for nuclear deterrence and the need to preserve the capability to restructure or adapt the composition and level of the nuclear force structure in response to evolving national defense policy issues. I will discuss what these issues are and the necessary DOE responses. The fundamental DOE response is the maintenance of U.S. nuclear competence.

I intend to discuss four major topics in the remainder of my statement: the elements of nuclear competence, the evolving policy issues, the implications of the issues to our program, and, finally, the major accomplishments and

FY 1989 budget request for programs.

3. NUCLEAR COMPETENCE - THE FUNDAMENTAL RESPONSE

Nuclear competence is essential to ensure a viable nuclear deterrent. This competence is comprised of several primary components. A fundamental component is the scientists and engineers in our nuclear weapons laboratories experienced in the technologies pertinent to nuclear weapons design, development, testing, and production support. Another fundamental component is the scientists, engineers, and technicians in our weapons production plants. An integral component of nuclear competence is the continued ability to conduct nuclear testing on a technically justified level to support our research to avoid technological surprise, conduct development programs for new weapons to address changing threats, and to maintain our existing weapons stockpile. Testing is a critical element in any experimental program and, in the case of nuclear weapons research, underground testing is essential to obtain the necessary scale that cannot be obtained in the laboratory. Moreover, for nuclear weapons scheduled to enter the stockpile, it is important that we test thoroughly just as the Department of Defense does for its delivery systems. Finally, modern equipment, computers, and facilities supporting our scientists and engineers are another integral component of nuclear competence. Simply stated, nuclear competence is diversely educated and experienced people; state-of-the-art computers; and, specialized equipment and facilities.

The scientific, engineering, and technological response capability encompassed in nuclear competence is, and will continue to be, essential in a dynamic technological and political world. This capability must be preserved to respond to transitions in military doctrine, force structures, arms control initiatives, and additional nuclear testing restrictions.

Nuclear weapons competence must be preserved, inasmuch as it exists nowhere else in the U.S. and it cannot be readily restored if any of its components are significantly degraded or eliminated. In fact, the capabilities of our nuclear weapons laboratories and the production complex are national assets and the mere preservation of their capabilities has a valuable deterrent effect on the Soviet Union, as do the actual warheads designed and produced. This competence is critical to avoid technological surprise, provide response capability for military requirements, and also protect the national security in the event of any treaty breakout. Accordingly, the weapons complex, and the nuclear competence it represents, must at all times be preserved at a prudent level until such time that the world's nuclear weapon stockpiles are reduced to zero and nuclear deterrence no longer is U.S. national policy. The necessary investment in nuclear competence is relatively very minor in the context of national defense spending considering the leverage provided by the nuclear deterrent to national and international security.

4. EVOLVING NATIONAL DEFENSE POLICY ISSUES AND PROGRAM RESPONSES

The nuclear weapons program is faced with several evolving national defense policy issues in providing the nuclear warheads to the Department of Defense for the Nation's nuclear deterrent. These issues relate to arms control initiatives, strategic defense, potential additional restrictions on underground nuclear testing, reliability and adequacy of tritium and plutonium supplies, and the maintenance and operation of the aging complex in a secure, safe, and environmentally acceptable manner. All of these issues will place a number of demands on the DOE nuclear weapons program.

ARMS CONTROL

Progress in arms control requires a reevaluation of the composition and level of the nuclear weapons stockpile. It also necessitates a technical response to address military requirements in the context of the agreements. Although the superpowers may relinquish a part of their nuclear weapons stockpiles, they will not relinquish their superpower military status. In an environment of shrinking stockpiles, the remaining nuclear weapons will assume an even greater role in providing an acceptable level of deterrence and stability between the superpowers. Therefore, the capability or nuclear competence of DOE must be preserved for the foreseeable future.

As you know, the Administration has sucessfully negotiated an agreement with the Soviets concerning intermediate nuclear forces and is actively engaged in Strategic Arms Reductions Talks (START). Within the context of these agreements DOE will be called upon to maximize the capability and reliability of the stockpile that remains.

However, even within the context of any arms control agreements, there may develop or still exist a number of Soviet military targets that the U.S. cannot hold at risk and new warhead designs may be necessary as a result. In addition, new warhead designs may be necessary to accommodate advances in nonnuclear technologies such as advances in missile accuracies and stealth characteristics. Consequently, new warhead designs may be required to accommodate more restrictive space geometries and/or volumes; more demanding yield to weight ratios; and, new stockpile to target sequences. There will continue to be a need to modernize nuclear warhead safety, security, and command and control technology. At all times, DOE must preserve its capability to assess adversary threats and avoid technological surprise. All of these responsibilities remain with DOE within the confines of any international agreements.

In addition to the reevaluation of the composition and restructuring of a new nuclear weapons stockpile within the context of any negotiated Intermediate Range Nuclear Forces (INF) and/or Strategic Arms Reductions Talks agreements, DOE will be called upon to assess parity and verification matters related to arms control. Arms control will hopefully lead to greater stability; however, the DOE weapons program must remain strong to achieve and maintain nuclear weapons deterrence within the context of any agreements.

STRATEGIC DEFENSE RESEARCH

The Administration has accelerated strategic defense research. Quite possibly, strategic defense research may ultimately lead to a national strategy of strategic defense in combination with or in lieu of the offensive nuclear deterrent. Greater reliance on mutually assured defense rather than mutually assured destruction may be possible in the future.

The Department must research nuclear directed energy weapons to avoid technological surprise by the Soviet Union. We must understand the Soviet nuclear directed energy weapons capability to threaten proposed nonnuclear strategic defense architectures, and also to determine the feasibility of nuclear directed energy weapons as a strategic defense option, if necessary. It is also critically important to understand the nuclear directed energy weapons threat to our current nuclear deterrent forces. DOE must maintain a viable effort as part of the Strategic Defense Initiative (SDI) and also as part of its responsibility to ensure a viable nuclear deterrent.

Although strategic defense may provide an additional major disincentive for a Soviet offensive strike and eventually dramatically reduce the number of offensive nuclear warheads, some offensive nuclear warheads will probably be necessary to ensure nuclear deterrence. A technical response to new military and modernization requirements for those remaining weapons will be necessary.

POTENTIAL ADDITIONAL RESTRICTIONS ON UNDERGROUND NUCLEAR TESTING

Another national defense policy issue facing the nuclear weapons program is the possibility of greater restrictions, below the 150 kiloton yield limit, on underground nuclear testing. In addressing such a challenge we must first understand the implications of any additional restrictions on the capability of our weapons laboratories to certify, with acceptable confidence, the performance of specific features of current weapon design concepts and to develop new warhead designs to meet future military requirements. If we are to avoid any unacceptable limitations in maintaining our nuclear deterrence, it will be necessary to intensify underground nuclear testing for a sustained period before we are able to responsibly assess our ability to maintain the nuclear deterrent and nuclear competence with greater restrictions on testing. The Department is developing a report, as requested by Congress, to assess the feasibility of reduced reliance on nuclear testing. We will be expanding on many of the issues I will discuss today. However, it is clear that nuclear testing will always be necessary in support of a truly dynamic research and development program and to verify with confidence the performance of the deployed stockpile.

NUCLEAR MATERIALS SUPPLY

A critically important national defense policy issue is meeting the demand for tritium and plutonium for the nuclear deterrent. Our production reactors and processing facilities are becoming increasingly fragile. A reliable source at the appropriate capacity for the new production of these materials is essential to our nuclear deterrence. This responsibility, upon which the success of the nuclear weapons program is dependent, is assigned to the Deputy Assistant Secretary for Nuclear Materials Production.

DOE will be placing the N Reactor at the Hanford Site in a cold standby status. We project the nuclear materials requirements of the Department of Defense (DOD) can be met through recycle and reclamation of materials and the operation of the three reactors at Savannah River.

Plans are also in place to assure a tritium supply in the late 1998-1999 time period with replacement reactor capacity. It is critical that we restore our capacity for manufacturing tritium now. The need for additional plutonium and oralloy will be determined depending on Strategic Arms Reductions Talks and force requirements. These materials do not decay for thousands of years. Tritium decays with a 12 year half-life. It is critical to the operation of virtually all nuclear weapons. There is no alternative, and losing our tritium is tantamount to unilateral disarmament. Special Isotope Separation technology will provide a limited reactor-independent supply of plutonium by 1995.

Nuclear material for weapons production and stockpile maintenance is also achieved through reclamation and recycling activities within the weapons complex as part of my responsibility. In conjunction with these activities, it is critically important that we have a viable set of facilities at the Rocky Flats, Savannah River, and Y-12 Plants.

The Plutonium Recovery Modification Project at Rocky Flats, the Enriched Uranium Recovery Improvements Project at Y-12, and the Tritium Loading Facility Replacement at Savannah River Plant are major construction projects that will help to preserve this capability.

OPERATION OF THE COMPLEX IN A SAFE AND ENVIRONMENTALLY ACCEPTABLE MANNER

Operating the weapons complex in a safe and environmentally acceptable manner is another national defense policy issue. Safety and environmental oversight are likely to intensify and DOE is committed to respond to these concerns as well as program requirements. With an aging complex, a legacy of environmental issues accumulated over 40 years, and increasingly stringent regulations responding to all these concerns will be a major challenge.

The Department has been taking extensive actions to be assured that its operations are safe and environmentally acceptable. The Secretary has undertaken a series of new initiatives through the issuance of new orders, the provision of internal oversight, and plans for independent external oversight in order to assure compliance within the Department with the many new nuclear safety requirements. In the environmental area, negotiations have been initiated with many of the state environmental regulatory agencies and the Environmental Protection Agency (EPA) in order to establish compliance agreements which will be legally binding. All of these actions will impact the FY 1989 and future year budgets.

OPERATION OF THE COMPLEX IN A SECURE MANNER

Operation of the complex in a secure manner is also a key national defense policy issue. Although threat scenarios are dynamic and present an ever changing challenge, advancements in safeguards and security technology present new methods to mitigate identified facility concerns in a timely and cost-effective manner. We are responding to this challenge, in part, by developing at our key facilities plans entitled Master Safeguards and Security Agreements (MSSA) which document the security systems facility management will employ in responding to the spectrum of threats. Periodically, evaluations are conducted by various DOE organizations to assess program effectiveness and to recommend corrective actions.

MAINTAINING THE WEAPONS COMPLEX

The nuclear weapons complex is currently in a state of fragility as a result of emphasizing nuclear weapon system production to meet military requirements within available funding resources. Ultimately, this shortsighted approach will cripple our ability to avoid technological surprise and respond to nuclear weapon system production in the future. Timely replacement of capability is necessary to avoid fragility. The challenge facing the nuclear weapons program is a proper balance of support for near-term weaponization and long-term capability of the weapons complex within realistic funding profiles. Our response to restoring and maintaining the complex is incorporated in the Nuclear Weapons Research, Development and Testing Revitalization Program, Facility Capability Assurance Program, and General Plant Projects Program. All of these programs encompass the construction projects necessary, in balance with programmatic requirements and funding, to ensure the long-term capability of the nuclear weapons complex.

5. SUMMARY OF THE PROGRAM IMPLICATIONS IN RESPONDING TO EVOLVING NATIONAL DEFENSE POLICY ISSUES

In summary, there are a number of implications for our program in restructuring or adapting the nuclear forces in response to these issues. We must be able to maintain and improve our capability to: develop nuclear weapon warheads to meet new military requirements within the context of any arms control agreements; retrofit and/or replicate existing nuclear designs in the event of severe restrictions on nuclear testing; assess the effects of nuclear weapons on military assets; avoid technological surprise; assess parity and verification issues; and understand nuclear directed energy weapons to evaluate their effect on strategic defense systems and/or their contribution to deterrence in combination with strategic offensive nuclear forces.

As we address the programmatic requirements, we will also take the necessary actions to operate the weapons complex in a secure, safe, and environmentally acceptable manner. We must also ensure that the long-term viability of the current fragile weapons complex is addressed by steady progress in maintaining and restoring aging utility systems and facilities.

The response to these challenges will require a vital DOE weapons program, which in turn requires nuclear weapons competence. It is simply incorrect to anticipate a future requiring less weapons research, development and testing or an absence of productive capacity for a modernized nuclear weapons stockpile while nuclear deterrence remains national policy.

Major efforts are underway to quantify the response to those evolving policy issues. We have underway a modernization study of the weapons complex and a study to assess the feasibility of reduced reliance on nuclear testing. Each of these studies will be submitted to all of our cognizant authorization and appropriation subcommittees as directed by Congress. The findings of these studies and the corresponding discussions should prove helpful as the Administration and Congress chart the course of the nuclear weapons program. We are also monitoring any arms control impacts on nuclear testing as requested by Congress, and DOE will keep you informed of key developments.

At this time, I would like to present you with the major accomplishments and FY 1989 budget request for our programs.

6. MAJOR ACCOMPLISHMENTS AND FY 1989 BUDGET REQUEST FOR WEAPONS ACTIVITIES

SUMMARY OF FY 1989 BUDGET REQUEST FOR WEAPONS ACTIVITIES

The FY 1989 budget was formulated in view of the greatly constrained budgetary situation facing the entire Federal Government. Military requirements notwithstanding, DOE, following the lead of DOD, significantly reduced its request for FY 1989 funding after the FY 1988 Budget Summit, which set budget targets for both FY 1988 and FY 1989 spending levels for all Federal Government programs.

A careful balance has been achieved between the requirements for today and the needs for tomorrow. In the forum of the Nuclear Weapons Council, nuclear weapon production requirements were reexamined jointly by the Departments of Defense and Energy, resulting in major reductions in some future systems, as well as modified projections throughout the planning period. Further adjustments to these schedules may be required to accommodate budget constraints in the outyears. Conversely, there has been a recognition that the long-term capabilities must be maintained. The Facilities Capability Assurance Program in our nuclear weapons production complex, our revitalization efforts at the research and development (R&D) laboratories and the Nevada Test Site (NTS), and our general plant projects are all supported to preserve and upgrade the long-term capabilities of the nuclear weapons complex.

The FY 1989 budget request for Weapons Activities totals $4,256.9 million as presented by major activity in this chart (Chart 1). Based on a 3 percent escalation rate, the FY 1989 request for Weapons Activities programs will be about 2 percent below FY 1988 levels. Specifically, this means that: 1) nuclear weapon stockpile requirements, as agreed to by the Nuclear Weapons Council, shall be supported for FY 1989; 2) research continues on nuclear directed energy weapons and Inertial Fusion programs at the FY 1988 pace; and,

SUMMARY TABLE
(DOLLARS IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROPRIATION	FY 1989 REQUEST
RESEARCH AND DEVELOPMENT	$1,226.8	$1,305.3	$1,323.2
TESTING	618.7	599.6	591.1
PRODUCTION AND SURVEILLANCE	2,247.4	2,227.7	2,261.2
PROGRAM DIRECTION	70.0	74.8	81.4
TOTAL WEAPONS ACTIVITIES	$4,162.9	$4,207.4	$4,256.9

CHART 1

3) the research, development and testing core activities must be constrained to below the FY 1988 level of effort. The request supports minimum requirements to restore our aging facilities and to maintain operations and projects required to assure the continued secure, safe, and environmentally acceptable operation of this Nation's nuclear weapons facilities.

WEAPONS RESEARCH, DEVELOPMENT AND TESTING

OVERVIEW

The nuclear Weapons Research, Development and Testing (WRD&T) Program provides the primary scientific and technological underpinning for U.S. nuclear deterrence. At present, nuclear deterrence provides the highest leverage for national security per dollar spent. U.S. national security rests on defense technologies, the capability to respond to new threats, and avoidance of technological surprise. The goals of the Weapons Research, Development and Testing program are to ensure continued and improved safety, security, and reliability of the existing stockpile of nuclear weapons; provide design, engineering development, and testing for new weapon concepts and engineering support for new weapons entering the stockpile; maintain the scientific and engineering capability to provide a continuing flow of technical knowledge and innovations to support the development of new weapons; and avoid technological surprise by an adversary. The Weapons Research, Development and Testing Program activities are key elements in applying atomic energy technology to the common defense as vested in the DOE weapons program by the Atomic Energy Acts of 1946 and 1954, as amended. This program is vital because nuclear deterrence has been and continues to be the foundation of U.S. national security.

This program provides for the efforts performed by the Lawrence Livermore National Laboratory (LLNL), the Los Alamos National Laboratory (LANL), the Sandia National Laboratories (SNL), the Nevada Operations Office (NVO), and other contractors in research and development of nuclear weapons. This includes research, development, engineering, and certification of nuclear warheads required by DOD for stockpile, investigation of concepts and technologies for future weapons, and advancement of the sciences and technologies applicable to nuclear weapons as well as related research on and threat assessment of nuclear directed energy weapons (NDEW) for the national Strategic Defense Initiative Program. Inertial Fusion activities are incorporated into the Weapons Research, Development and Testing Program because of their contribution to the weapons technology base.

CORE PROGRAM

The major program elements of the Weapons Research, Development and Testing Core Program are the technology base; weapons development, engineering, and certification (WDEC); and underground nuclear testing. We are requesting $1,465 million for the Core Program in FY 1989 as seen in this chart (Chart 2).

RESEARCH, DEVELOPMENT, AND TESTING-CORE PROGRAM
(DOLLARS IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROPRIATION	FY 1989 REQUEST
OPERATING EXPENSES	$1,126.5	$1,165.6	$1,169.0
CAPITAL EQUIPMENT	119.8	124.1	127.9
CONSTRUCTION	130.7	177.2	168.6
TOTAL, CORE PROGRAM	$1377.0	$1,466.9	$1,465.5

CHART 2

The technology base is the fundamental component that assures nuclear competence for the Nation's nuclear defense program. It is unique and brings together diverse scientific and engineering expertise (people), applied and scientific knowledge, and specialized equipment, facilities, and data bases into a capability which is fundamental for responding to U.S. security needs in the long term. Programmatically, the Core Program is made up of the technology base directed toward all three generations of nuclear weapons: fission (high explosives, hydrodynamics, fission physics); fusion (boosting, radiation flow, radiation compression, fuel burn); and tailored outputs (x-ray, gamma-ray, electromagnetic, laser, Deleted

Weapons development, engineering, and certification activities are guided by current national security requirements for providing new strategic nuclear weapon options, and for maintaining the reliability and improving safety and security of all nuclear weapons now in stockpile.

Underground nuclear testing is an integral and essential part of the overall weapons research, development and testing effort. Currently, we rely on underground nuclear testing to measure the performance of stockpile weapons.

This is the only way that we can assure that our stockpile is safe and reliable. Furthermore, our underground test program is essential for studying the complex processes critical for understanding and improving nuclear weapons. There are no above-ground test facilities that enable us, at present, to measure the physical processes by which nuclear energy is released in a nuclear explosive.

ACCOMPLISHMENTS

The Core Program achievements for FY 1987 and thus far in FY 1988 have been outstanding. Our accomplishments have helped confirm our confidence in the nuclear weapons stockpile, have permitted us to make significant advances in new nuclear design technologies, have included experiments designed to better understand device physics, and have provided nuclear sources or assistance for others. Especially noted are:

- Testing performance for stockpile warheads within the constraints of the Threshold Test Ban Treaty yield limit, and for improved safety Deleted Deleted
- Developing options for new nuclear systems for DOD Deleted Deleted

- Designing and executing innovative experiments directed toward new design concepts, exploratory research in weapons physics and fundamentals of stockpile reliability

Deleted

- Work-for-Others including devices for Defense Nuclear Agency (DNA) effects experiments *Deleted* *Deleted* and assistance to the United Kingdom.

During this period, *Deleted* tests were conducted in the technology base program. *Deleted* tests explored the physics of nuclear devices which address fundamental reliability issues. *Deleted* tests studied the fission and fusion processes of primaries.

Deleted

Finally, *Deleted* tests were conducted to support work-for-others.

Deleted

tests were conducted by the Defense Nuclear Agency for their effects experiments

Deleted

The supporting technologies made important contributions to the Core Program accomplishments. Significant improvements in nuclear weapon safety were made.

Deleted

FY 1989 PROGRAM PLANS

For the remainder of FY 1988 and FY 1989, we plan to continue a balanced program among the non-Strategic Defense Initiative categories: weapons development, engineering, and certification, advanced design technologies and fundamentals of stockpile reliability. In weapons development, engineering, and certification we have scheduled nuclear tests of stockpile weapons and for further characterization and improvement of the designing of our Phase 3 weapons, *Deleted* In the advanced development category we will have nuclear tests for various Phase 1,2 activities

Deleted

We also have an active program planned in our fundamentals of stockpile reliability category.

Important tests are scheduled to better understand boosting in primaries, radiation flow, and secondary ignition and burn. Included in this category will be tests critical to stockpile reliability in an era of fewer or lower yield tests. Finally, we will continue to support the Defense Nuclear Agency, *Deleted* , and the United Kingdom by providing nuclear devices or assistance for their various research efforts. The Joint Verification Experiment (JVE) is still being negotiated and its circumstances are uncertain. It is not explicitly shown in the FY 1988 budget request. If this test becomes certain, *Deleted* *Deleted* . This would have minimum impact on our program; however, it is still likely that one of the technology base tests will have to be deferred until FY 1990 to provide resources for this experiment.

The supporting technologies will continue to be directed toward maintaining the nuclear competence required to assure stockpile safety and reliability, and to avoid technological surprise. Research and development (R&D) will be conducted across the full spectrum of nuclear weapon activities: physics, computation sciences, material sciences, chemistry, and engineering. These R&D activities will have several important payoffs. They will provide new and improved data based in the atomic and nuclear physics. Better computational facilities and modeling codes for better predictive capabilities. Aboveground testing facilities will be expanded for acquiring the basic physics data and validating computer modeling codes. These facilities cannot replace underground testing but will be complementary to our underground program.

EMERGENCY RESPONSE PROGRAM

ACCOMPLISHMENTS

The Department maintains a diverse program of technical expertise, specialized equipment, and uniquely capable personnel to effectively respond to the wide spectrum of accidents and incidents which may directly or indirectly affect the Department's weapons complex or call for the use of its assets to respond to requests for assistance from others, on a worldwide basis. This program is constantly reviewed to assure its ability to meet existing needs and to prepare the capabilities to meet future needs. This year we have instituted a program to further enhance the integration of our individual assets to assure effective coordination and to better interface with other local, Federal, and international response assets. We have also participated in numerous exercises, both Departmental and jointly conducted, with other Federal and international response assets. The Department has instituted a program to revisit lessons learned in previous exercises to assure timely implementation of corrective actions. All of this is to assure that we maximize the benefits from our exercise program. We continue to upgrade our program for specialized equipment acquisition and maintenance and to develop a program for enhancing the specialized training provided to our response personnel as well as special personnel from other response assets. Along with these activities, we are continuing to institutionalize our support arrangement with others, and, working with the Department of State, to develop a coordinated approach for providing assistance to other nations, including assisting them in developing their own assets.

NUCLEAR DIRECTED ENERGY WEAPONS

OVERVIEW

The purpose of the Strategic Defense Initiative (SDI) is to eliminate the threat posed by strategic nuclear missiles. There is a role for DOE within the Strategic Defense Initiative because of our charter to research nuclear energy applications, given in the Atomic Energy Act. By agreement between

Secretary Herrington and Secretary Weinberger in 1985, the DOE role is defined in three areas. First, we are thoroughly analyzing several concepts to find out if an adversary can develop nuclear directed energy weapons that would negate a nonnuclear strategic defense system. Next, we want to understand the effect on our strategic retaliatory forces if an adversary were to develop and use nuclear directed energy weapons concepts in a Strategic Defense Initiative-like system. Finally, we want to preserve a U.S. option to use nuclear-driven defensive weapons as a component in the Strategic Defense Initiative should it be deemed to be in the country's interest. Our participation in the Stratetic Defense Initiative is closely coordinated with DOD.

Because of restricted funding levels over the past 2 years, we have pursued a level of effort that is less than we might have planned. We have made both vertical cuts by eliminating concepts from consideration and horizontal cuts by reducing the level of effort since last year. As depicted in tbis chart (Chart 3), we are requesting a total of $285 million in FY 1989 for nuclear directed energy weapons. At this point, we are continuing investigation into x-ray lasers, optical frequency lasers, and hypervelocity projectiles at the DOE laboratories, with attendant systems analysis and vulnerability, lethality, and countermeasure studies. Nuclear directed energy weapons technology does not interfere with our basic mission but rather is an extension of the core technology base. The technical feasibility milestone dates have moved Deleted , delaying a concept feasibility determination

Deleted

NUCLEAR DIRECTED ENERGY WEAPONS (DOLLARS IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROPRIATION	FY 1989 REQUEST
OPERATING EXPENSE	$270.0	$240.0	$252.2
CAPITAL EQUIPMENT	32.2	17.0	17.5
CONSTRUCTION	14.8	22.0	15.3
TOTAL, NDEW	$317.0	$279.0	$285.0

CHART 3

ACCOMPLISHMENTS

The achievements obtained in FY 1987 and thus far in FY 1988 are impressive, as described below.

X-RAY LASERS

Deleted

HYPERVELOCITY PROJECTILES

Another nuclear directed energy weapons concept, the *Deleted* nuclear-driven hypervelocity projectiles concept, can be likened to a nuclear-driven shotgun. We believe that hypervelocity projectiles, propelled by a nuclear explosive device over long distances, will be able to inflict catastrophic damage to the full spectrum of strategic defense targets.

In FY 1987, key issues were identified by Los Alamos National Laboratory regarding necessary conditions for driving projectiles, using computer programs and above-ground, high-explosive tests. This gives added direction and focus to future activities in the program.

Deleted

. This will allow repetitive testing, in a laboratory environment, to obtain basic data needed to support later, more complex experiments. Additional above-ground tests looked into other areas such as developing diagnostic tests and instrumentation for this new and unique technology to provide greater understanding of basic physics and engineering issues.

Mission and systems analyses were completed for this concept

Deleted

OPTICAL FREQUENCY LASERS

Deleted

The FALCON reactor-pumped laser at Sandia National Laboratories achieved lasing in a laboratory experiment on an existing research reactor. Experiments to increase laser output are underway.

The Idaho National Engineering Laboratory is investigating the CENTAURUS reactor-pumped continuous wave laser concept. A laboratory test is planned on an existing reactor to measure laser gain later this year. This is the first technical milestone in the CENTAURUS program.

FACILITIES

While construction for DOE's nuclear directed energy weapons program is limited, it has been successfully on time and within budget. Work on the shared DOE and Strategic Defense Initiative Organization (SDIO) funded Strategic Defense Facility at Sandia National Laboratories, Albuquerque, New Mexico, is progressing on schedule. Phase 1, the light laboratory and office building, is under construction, and design definition approval for Phase 2, the directed energy experimental building, was granted by the Assistant Secretary for Defense Programs in September 1987. The facility will be used to support research on the x-ray laser, microwave generators, pulsed powers, electromagnetic launcher, and other Strategic Defense Initiative projects.

FY 1989 PROGRAM PLANS

For FY 1989 we are planning a very ambitious and exciting nuclear directed energy weapons program.

Deleted

The FALCON nuclear reactor-pumped optical laser program will attempt to demonstrate a laboratory-scale laser of *Deleted* output on an existing reactor facility. This energy output level for FALCON is a required program milestone before further FALCON research and development would be approved.

Construction of the Strategic Defense Facility's light laboratory/office building should be completed, and installation of laboratory equipment should commence, in preparation for experimental activity in early FY 1990.

In summary, each of the three nuclear directed energy weapons concepts is being vigorously pursued, to the extent possible with the available funding. While technical feasibility dates have been delayed, DOE nuclear directed energy weapons studies should provide critical information to DOD decision-makers on the possible effect of nuclear options on strategic defense and offense.

INERTIAL FUSION

OVERVIEW

The Inertial Fusion Program is part of the weapons research, development and technology base. Its mission is to enhance the national security of the U.S. by contributing to advanced military and civilian technologies. We do research to determine the feasibility and affordability of laboratory micro-fusion using a laser or particle beam initiator. In FY 1987, major accomplishments were achieved in experiments with the NOVA laser Deleted

Deleted . We are now to the point where all but the most severe critics agree that the basic feasibility of the target physics has been proven. We are in the exciting position of beginning to plan for the next step: a large inertial confinement fusion applications facility that can produce up to a thousand million joules of energy, equivalent to a quarter-ton of high explosive. Such a facility would have long term important and highly significant military applications, including experiments on selected weapons physics issues pertaining to design, diagnostics, nuclear directed energy weapons, nuclear weapons radiation effects simulation, and nuclear hardness and survivability testing. However, we must provide a note of caution here. No facility of this type is a substitute for nuclear testing. Inertial confinement fusion may be able to examine physics issues of nuclear explosives, but does not scale to weapons. The facility, which is just in the beginning planning stage, would also contribute to civilian applications, such as the development of a nearly inexhaustible energy supply from electrical generators powered by inertial confinement fusion.

The target physics program, advanced driver development, and planning for the Laboratory Microfusion Facility (LMF) will be supported by the FY 1989 budget request of $164 million (Chart 4). This budget level is consistent with the National Academy of Sciences recommendation of level of effort funding. As a result of the historic results obtained in target physics in FY 1987, Inertial Fusion Program resources will be allocated to help strengthen driver technology, which now appears to be on the critical path to a laboratory microfusion capability.

RESEARCH, DEVELOPMENT, AND TESTING-INERTIAL FUSION (DOLLARS IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROPRIATION	FY 1989 REQUEST
OPERATING EXPENSES	$142.7	$151.0	$155.5
CAPITAL EQUIPMENT	8.9	8.0	8.3
TOTAL, INERTIAL FUSION	$151.6	$159.0	$163.8

CHART 4

ACCOMPLISHMENTS IN FY 1987

The Inertial Fusion Program has achieved historical results in 1987 and has reached a major turning point.

Deleted

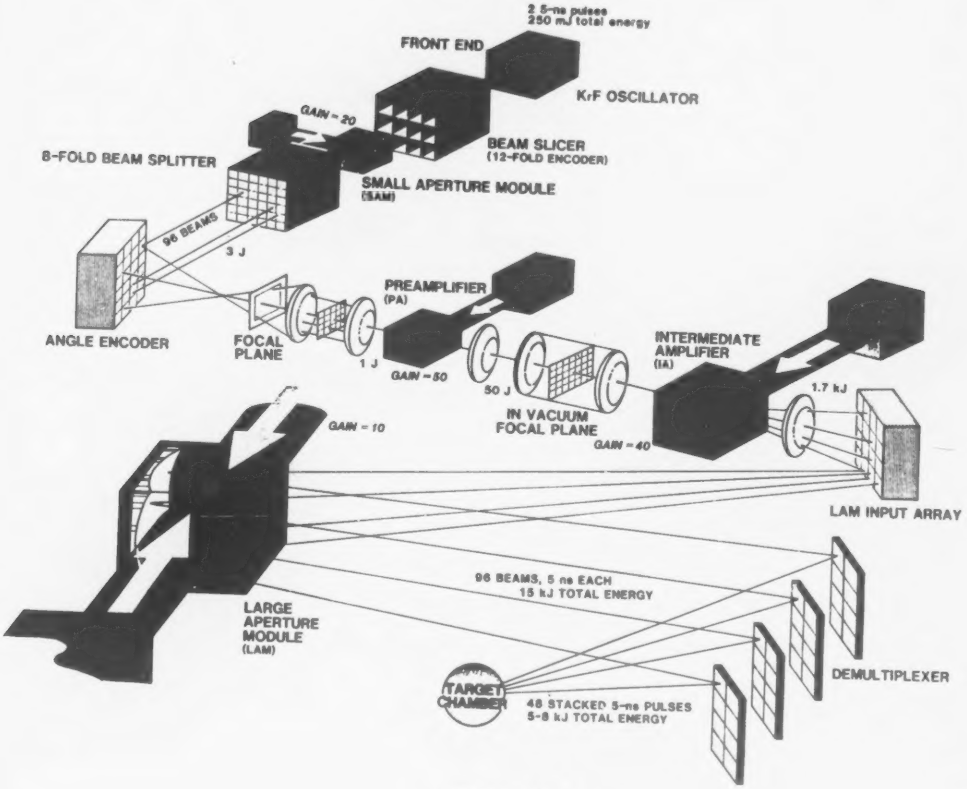
At Lawrence Livermore National Laboratory, the NOVA laser (Chart 5) was used to create a uniform distribution of x-rays used to implode a capsule filled with gaseous fuel. The capsule compressed more than 30 times in radius (equivalent to squeezing a softball to a bb-size pellet). This is near to the laboratory fusion capsule design requirement of 40 times compression in radius needed to achieve high-gain. Frozen thermonuclear fuel capsules were imploded by spherically symmetric laser irradiation for the first time on OMEGA (Chart 6) at the University of Rochester. [CHARTS 5 & 6 DELETED]

Concern over possible deleterious effects of a fusion capsule instability was reduced by discovery at the Naval Research Laboratory of a self-healing effect in direct-drive pellets. Scientists at KMS Fusion fabricated many high quality targets for NOVA and OMEGA experiments.

The recommendations of the National Academy of Sciences Happer Panel review of the U.S. Inertial Fusion Program, completed in 1986, included assignment of top priority to target physics issues, with an evaluation of progress in 5 years. The excellent agreement of computer calculations *Deleted* *Deleted* with the results of target performance on NOVA experiments indicates that many of the target physics issues of concern to the Happer Panel have been successfully answered even sooner than anticipated.

Significant accomplishments also occurred in Inertial Fusion driver technologies. New world records were set in pulsed power energy storage and synchronization on PBFA II light ion accelerator at Sandia National Laboratories (Chart 7). [CHART 7 DELETED]

The AURORA KrF gas laser beams (Chart 8) at Los Alamos National Laboratory were successfully transported through the intermediate amplifier, and the complete optical system was installed.


2 5-ns pulses
250 mJ total energy
FRONT END
KrF OSCILLATOR
GAIN ~ 20
BEAM SLICER
(12-FOLD ENCODER)
8-FOLD BEAM SPLITTER
SMALL APERTURE MODULE
(SAM)
96 BEAMS
3 J
ANGLE ENCODER
FOCAL
PLANE
PREAMPLIFIER
(PA)
1 J
GAIN ~ 50
50 J
IN VACUUM
FOCAL PLANE
INTERMEDIATE
AMPLIFIER
(IA)
1.7 kJ
GAIN ~ 40
GAIN = 10
LAM INPUT ARRAY
96 BEAMS, 5 ns EACH
15 kJ TOTAL ENERGY
LARGE
APERTURE
MODULE
(LAM)
DEMULTIPLEXER
TARGET
CHAMBER
48 STACKED 5-ns PULSES
5-8 kJ TOTAL ENERGY

AURORA - LANL

CHART 8

PROGRAM PLANS

Because of the FY 1987 accomplishments, the program is undergoing re-planning, with the major goal of determining feasibility and affordability of a Laboratory Microfusion Facility in the late 1990s. This requires new developments in advanced driver technology, while maintaining the present level of effort in the fusion capsule physics program. A decision date of 1991-1992 to choose the Laboratory Microfusion Facility driver is necessary to provide the capability by the late 1990s. A Laboratory Microfusion Facility providing thermonuclear capsule energy output of 100 million to 1 billion joules can have significant impact on nuclear hardness and survivability testing and on certain weapon physics issues. This capability would be synergistic with underground nuclear tests, but could not replace the need for underground testing. The Laboratory Microfusion Facility would also contribute to advances in nuclear design capability, high-speed diagnostic instrumentation, and nuclear directed energy technology. In addition to the direct benefit to military programs from experiments in a Laboratory Microfusion Facility, there would be the less tangible, but extremely important benefit of useful training and experience provided to maintain a professional cadre of physicists, engineers, and test personnel in an area related to nuclear weapon physics. The studies of high gain thermonuclear capsule designs with a Laboratory Mirofusion Facility will also provide direct benefit for development of commercial power generation, through the development and demonstration of cost effective high-gain fuel pellets.

The new program planning strategy incorporates independent program reviews for each of the candidate driver technologies which could be developed in time to provide a Laboratory Microfusion Facility capability by the late 1990s. Outside experts in each driver technology will review the technology base being generated to determine the capability to meet the required driver performance, the critical driver cost factors, and the driver affordability. In addition, a laboratory microfusion capability study is proceeding under the direction of the Division of Inertial Fusion at Headquarters, DOE, to define the potential applications and benefits of a Laboratory Microfusion Facility, and to address the driver-independent (Phase I) and driver-dependent (Phase II) configurations and cost estimates of such a capability.

FY 1986-1989 MILESTONES

In FY 1988-1989, the program will continue to concentrate on target physics studies with *Deleted* NOVA, and OMEGA, and on driver development with PBFA II and AURORA.

Deleted

installation of new "platinum-free" laser glass will be completed, allowing experiments to address pulse-shaping and hohlraum physics at higher energy. Advanced solid-state laser development will continue for application to a multi-megajoule laser. On PBFA II, lithium ion beam generation and focusing to sufficiently high power in FY 1988 will allow ion beam hohlraum experiments in FY 1989. Pulse-shaping of light ion beams by transport in plasma channels and through a new pulsed power technology will also be developed in FY 1989. The AURORA KrF experiment will reach the multi-kilojoule level of energy on targets in FY 1988-1989. KMS Fusion will participate in target fabrication and development, supplying a variety of targets for NOVA and OMEGA experiments. Direct-drive compression experiments of 100-200 times liquid density will be attempted on the OMEGA laser in FY 1988. The Naval Research Laboratory will continue studies in both the glass and gas laser programs.

PRODUCTION AND SURVEILLANCE

OVERVIEW

The Weapons Production and Surveillance Program supports the fabrication and assembly of nuclear weapons and weapon components, and stockpile maintenance and reliability assessment. Production and Surveillance activities are supported by a decentralized, nationwide complex of government-owned, contractor-operated facilities.

Our FY 1989 budget request of $2.3 billion supports the production, stockpile improvement, and stockpile surveillance activities for a wide range of warhead and bomb programs essential to the national defense interests (Chart 9).

PRODUCTION AND SURVEILLANCE (DOLLARS IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROPRIATION	FY 1989 REQUEST
OPERATING EXPENSES	$1,799.6	$1,853.7	$1,909.4
CAPITAL EQUIPMENT	121.4	115.1	118.6
CONSTRUCTION	326.4	258.9	233.2
TOTAL P&S	$2,247.4	$2,227.7	$2,261.2

CHART 9

WEAPON BUILDS/DELIVERIES AND STOCKPILE IMPROVEMENT

In FY 1987, the DOE weapons production complex completed all of the required production milestones, an accomplishment for which we are extremely proud.

Deleted new warheads were produced and delivered to DOD for deployment. End-of-production was achieved for the W76 TRIDENT warhead for the submarine-launched missile force. For FY 1988, we have achieved end-of-production on the W84 warheads for the ground-launched cruise missile program dependent on the acceptance and ratification of the treaty on intermediate range nuclear forces. Production continued throughout FY 1987, and will continue through FY 1988, on the B61 tactical bomb system, the B83 strategic bomb system, and the W80 submarine and air-launched cruise missile warheads. Initial production was accomplished for the W87 PEACEKEEPER warhead system which led to an Initial Operational Capability for this extremely important system in December of 1986. The introduction of the W87 warhead system into the war reserve stockpile was, we believe, a particularly noteworthy achievement exemplifying the finest cooperation between the DOE laboratories, production facilities, the DOD, and the Congress in executing a fast-track warhead development program designed to meet a critical national defense mandate. Two (2) new warheads progressed on schedule in the production engineering phase of development, the W88 Trident II warhead, and the W82 155mm artillery-fired projectile.

In FY 1987, considerable effort was also devoted to the upgrade of the reliability and safety of the existing stockpile with the continuation of the B61-1 strategic bomb upgrade and the completion of the W31 NIKE HERCULES warhead upgrade program. Delete

Deleted We continue to believe that a substantial continuing investment in continued stockpile reliability and safety is absolutely essential to our mission and should not be subserved to any other aspect of our program. In FY 1988, we expected to transition three (3) additional warheads into the design engineering phase of development -- the Small Intercontinental Ballistic Missile

(SICBM) warhead, the Short-Range Attack Missile II warhead, and the nuclear depth/strike bomb (NDSB). However, the SICBM warhead is no longer supported in the FY 1989 workload.

Although the total new production requirements (Chart 10) in FY 1989 are lower in terms of units produced than in the past several years, this is expected to be only a temporary effect

Deleted

The unit production ebb in FY 1988 and 1989 is due mainly to the reductions taken in our FY 1986 budget to comply with the Balanced Budget and Emergency Deficit Control Act of 1985 and, to some degree, revised military requirements. However, the FY 1989 production level in terms of equivalent workload when normalized to the level of effort required due to varying production complexity factors and the adjustment for procurement lead-time, is greater than the actual FY 1987 level. [CHART 10 DELETED]

Our FY 1989 budget request supports (Chart 11) the continuing build of B61-3/4 tactical bombs, the B83 strategic bomb, the W80 warhead systems for the submarine and air-launched cruise missiles, and the W87 PEACEKEEPER warhead. Production of warheads for the first 50 silo-deployed PEACEKEEPER missiles will end in FY 1989. In FY 1989, we will begin (Chart 12) quantity production of the W88 warhead for the TRIDENT II system and continue to retrofit the B61 strategic bombs. Consistent with direction from the Nuclear Weapons Council, our FY 1989 budget does not support the continuation of the SICBM program.

PROGRAMS SUPPORTED
(Continuing Builds)

- ✓MODERN TACTICAL BOMBS (B61-3/4)
- ✓CRUISE MISSILE WARHEADS (W80s)
- ✓MODERN STRATEGIC BOMB (B83)
- ✓SILO-BASED PEACEKEEPER (W87)
- ✓STOCKPILE MODERNIZATION (B61)

CHART 11

PROGRAMS SUPPORTED
(New Production)

- ✓TRIDENT II (W88)
- ✓MODERN ARTILLERY PROJECTILE (W82)
- ✓SRAM II (W89)
- ✓NUCLEAR DEPTH/ STRIKE BOMB
- ✓RAIL-BASED PEACEKEEPER (W87) *
- ✓FOLLOW-ON TO LANCE *
- ✓ASW/SOW *

** FOR PLANNING ONLY*

CHART 12

During FY 1989, we also will be pursuing pre-production activities that will lead to the introduction of four extremely important warhead/bomb programs *Deleted* *Deleted* These include the Short-Range Attack Missile II, the 155mm artillery fired atomic projectile, a modern nuclear depth strike bomb, and additional stockpile improvements to the B61 bomb stockpile. These systems not only will provide improved operational effectiveness, but also continue our efforts to provide a safer and more secure nuclear weapons stockpile. Several weapons systems may be pursued in the future following congressional approval. These weapon systems involve the Rail-Based Peacekeeper, Follow-on to Lance, and the Antisubmarine Warfare Standoff Weapon.

We believe that it is essential that DOE's production complex be in the strongest possible position to meet the DOD workload requirements in the 1990s. This cannot be assured unless we make the appropriate prudent investments in FY 1989 to procure materials and tooling and accomplish the necessary facility construction and upgrades that are essential in meeting currently projected demands.

Through the formulation of the Nuclear Weapons Stockpile Memorandum, the Departments of Defense and Energy worked closely together to develop a fiscally responsive, integrated, and realistic nuclear weapons development and production strategy for meeting our envisioned national security needs. Our FY 1989 budget request supports the resources necessary to assure that the Nation maintains the necessary nuclear weapons production capability base to meet future weapons production requirements.

STOCKPILE MAINTENANCE

A total of 27 systems were maintained in the stockpile for FY 1987, *Deleted* *Deleted* These activities include retrofits, modifications, repairs, limited life component exchanges, retirements (Chart 13), and evaluation activities including stockpile laboratory and flight tests. These activities, along with reliability assessments conducted throughout the year on a continuing basis, assure that the Nation's nuclear stockpile continues to remain safe, secure, and ready to provide nuclear deterrence. [CHART 13 DELETED]

In FY 1988, we will be maintaining about Deleted weapons comprised of 26 systems. The W53 TITAN II ICBM warhead was retired from the stockpile in FY 1987.

FY 1989 maintenance activities will be about the same as FY 1988, with the increase in funding, as for FY 1988, mainly attributed to the W76 TRIDENT warhead and the W68 POSEIDON warhead factory limited life component exchanges. Stockpiled systems will remain at twenty-six (26) with the retirement from the (inactive reserve) stockpile of the W71 SPARTAN surface-to-air missile warhead Deleted and the introduction of the W88 Trident II warhead, as indicated previously, in FY 1989.

PROCESS DEVELOPMENT

In order to assure we can accomplish the missions and programs of tomorrow, we need to prepare today. The Process Development program allows our production plants to achieve the successful introduction of new warhead programs (Weapon System Development), the improvement of production plant processes and operations (Manufacturing Development), and the initial scoping of new processes and techniques in evaluation of new weapon system concepts (Advanced Development). Frequently, productivity enhancements in manufacturing processes realized through Process Development translate into substantial outyear cost avoidances on new warhead programs.

In light of the restrictive budget we are facing, we have proposed some real reduction in funding, when accounting for escalation, in our FY 1989 request. With the three new weapon systems (Short-Range Attack Missile II, nuclear depth strike bomb, and W82 artillery fired atomic projectile) anticipated to be entering or in pre-production phase activities in FY 1989, development endeavors will be straining to support the successful introduction of these programs into production and the stockpile.

MANUFACTURING SUPPORT

Quality receives major emphasis in the production of nuclear weapons. Excellent quality is our goal in assuring that the production complex operates safely and efficiently, and that the systems and components produced are safe, effective, reliable, and can withstand the anticipated stockpile environments. To further our goal of excellence in quality and productivity, a new Quality Assurance Program was developed and initial implementation of a phased transition was completed in FY 1987. This plan is oriented toward the philosophy of eliminating the manufacture of defective product by improving the production processes and controls, as opposed to the previous quality philosophy that was directed to inspection and detection of defective product after manufacture. This approach is already showing results throughout the complex. The number of DOE in-plant inspectors has been reduced by 20 percent in the past two years, and scrap and rework activities are decreasing. Overall product quality and productivity is improving. Given the anticipated continuation of the tight fiscal climate, our productivity must continue to improve if we are to continue to meet our national security requirements on a timely basis with quality product.

Computer integrated manufacturing and design activities continue to improve our productivity. We have completed a wideband communications network between all nuclear weapon complex sites. This network facilitates the rapid, and accurate, transmission and review of weapons programs, designs, and plant information. The design for the W88 TRIDENT II warhead, which will enter quantity production in FY 1989, was accomplished in its entirety in the computer-aided environment, and more than 50 percent of the manufacturing activities in the production plants will be using computer integrated manufacturing processes.

The Department is pursuing a number of endeavors to help assure our facilities are sufficient to meet our responsibilities to DOD and the Nation. We believe it prudent and necessary to build and modify facilities and invest for the future. Our construction and modification plans and projects are directed to provide capability and capacity to serve for the remainder of this century, and beyond, providing the basis for new designs and endeavors.

In manufacturing, we will continue with the High Explosives Machining Facility project at the Pantex Plant. This $60 million project will provide assurance for the continued and uninterrupted machining capability of high explosives for nuclear weapons. Additionally, risk to personnel during the machining of high explosives will be reduced.

Another of the projects under construction in FY 1988 and FY 1989 is the Tritium Loading Facility Replacement at Savannah River, scheduled to be completed in FY 1990. Through support of the Congress and the Administration, this $120 million project will replace poor and inadequate tritium reservoir loading facilities needed to support the nuclear weapons production schedule and stockpile maintenance in FY 1990 and beyond.

Special Nuclear Materials and their timely availability and adequate supplies is an area of increasing concern to the Department and the Nation. Chernobyl has placed nuclear policies, practices, and facilities under the national spotlight. It is well known that DOE's existing facilities are dated, and with the evolution of new evaluation criteria and techniques, compliance with new safety and environmental regulations is often difficult and many times not possible. Investigative actions and new safety requirement implementation have reduced the DOE's ability to produce plutonium and tritium. These materials are vital for weapons production and stockpile maintenance.

Nonetheless, safety is paramount. Upgrades to accommodate environmental, safety, and health concerns have been identified and are being implemented. This continuing competition for funding has not been without programmatic impact. The plutonium supply/demand situation is now at a critical stage. Plutonium is supplied for new production at the Rocky Flats Plant (Chart 14) from three sources: (1) new production from the Savannah River Plant, (2) recovery of plutonium from retired weapons, and (3) from residue recovery at Rocky Flats, LANL, Savannah River, and Richland. All these supplies added together are necessary and critical to meet production commitments. Each of our plutonium facilities and plants, even with the perturbations experienced in the past few years, is required (Chart 15). [CHARTS 14 & 15 DELETED]

To enhance our nuclear materials position, and reduce the effects of unforeseen incidents and restrictions, we are attempting to enhance our plutonium recovery efforts to provide additional plutonium from scrap backlogs. This will require a coordinated plan of financial investment and processing capability expansion. Plutonium recovery is a cost-effective method of providing plutonium for production activities, which is supplemented by the production reactors. Enhancing our plutonium recovery will aid in the Deleted reducing stockpiled residues and attendant waste management considerations while lessening the risks from new plutonium supply interruption.

The plutonium recovery facilities in Buildings 771 and 776 at Rocky Flats, as currently configured, do not adequately support the long-term posture required to maintain the basic recovery mission for weapons production activities. The Plant's original plutonium facility, Building 771, continues to maintain its role of recovery in the nuclear weapons production complex. Building 771 is old; its equipment is wearing out, and maintenance and repair activities are necessary daily to keep it running. Built in 1953, it doesn't meet all of today's structural criteria, and is incapable of operating under revised safeguards standards. Building 776's mission is directed principally to the processing of plutonium from retired weapons, a very important mission to support new production activities. Built in 1957, it is also old and does not meet today's structural criteria. Radiation exposures to operating personnel are higher than desirable in this facility, due to the nature of the material processed (aged plutonium has a natural ingrowth of americium-241, an active gamma radiation emmiter). Although exposure does not exceed allowable limits, the Department would like to reduce these doses in consonance with our safety criteria (ALARA).

Building 371, built as a replacement to the aged plutonium facilities, failed to operate as intended and requires extensive modification. Building 371 is a fully hardened facility and is capable of meeting all current environment, safety and health, and safeguards and security criteria. As a result, it is the Department's best technical and management judgement that Building 371 should be modified as a replacement for the plutonium recovery operations in Buildings 771 and 776. Numerous studies have shown this course of action to be the most logical, most cost effective, and most desirable of all practical alternatives. The Plutonium Recovery Modification Project has a total estimated cost of $371 million.

Enriched uranium is another nuclear material which has an important role in the production of new weapons. Like plutonium, it too is recycled and recovered from manufacturing residues and retired weapons. Recycle and recovery is currently the source of uranium for new weapons production. No new enriched uranium has been bought from the enrichment plants for the weapons program since 1964. To assure the continued success of uranium recovery activities, the Department has pursued the Enriched Uranium Recovery Improvements Project since 1985. This $51 million project will be completed in FY 1989.

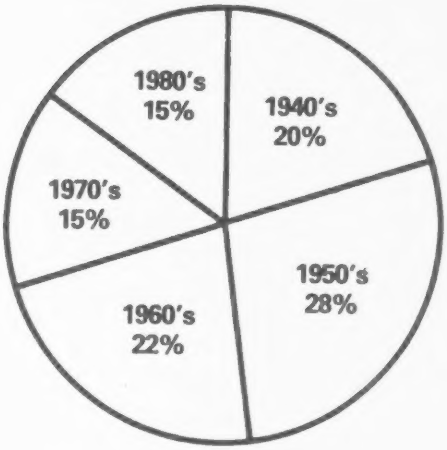
MAINTAINING THE WEAPONS COMPLEX

The Department of Energy is responsible for the production and lifetime surveillance of safe and reliable nuclear weapons in support of the U.S. national security. To accomplish this mission the research, development and testing complex and the weapons production complex have a unique set of facilities.

As is depicted in this chart (Chart 16), almost 50 percent of the entire weapons complex now in use is more than 30 years old. The building ages are also indicative of the utility systems' ages. For most buildings with normal maintenance, 30-40 years' age is when either major rehabilitation or replacement needs to be initiated. In addition to normal deterioration the nuclear weapons complex is being impacted by outdated technology.

CONSTRUCTION DATES OF NUCLEAR WEAPONS COMPLEX

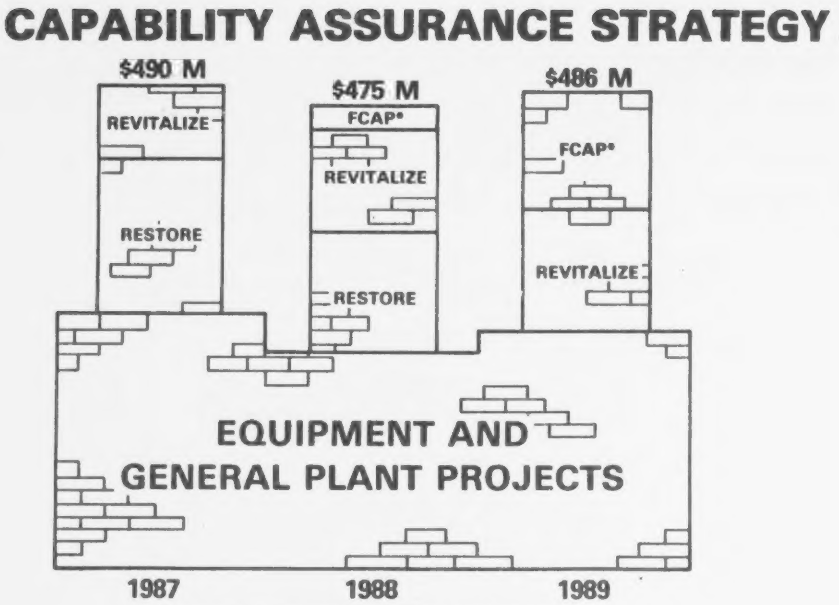
(33 MILLION SQUARE FEET)



EST REPLACEMENT VALUE
$15 + BILLION

CHART 16

Aging and the resultant fragility is an ongoing problem. Quick fixes are not the solution. A long-term strategy to assure sustained capability was developed. This chart (Chart 17) depicts our past and present strategy for assuring the viability of the weapons complex. Equipment and general plant project levels are the absolute minimum required to sustain the foundation. We are requesting in FY 1989 $55.7 million for general plant projects and $272.3 million for capital equipment. The capital equipment request is increasing 3 percent over FY 1988 appropriation, about the increase anticipated for inflation.



CAPABILITY ASSURANCE STRATEGY

* FACILITIES CAPABILITY ASSURANCE PROGRAM

CHART 17

ACCOMPLISHMENTS

We have successfully completed 12 of the 22 subprojects that constitute the FY 1984 and FY 1985 Revitalization projects. We anticipate successful completion of 5 more subprojects this year. Some of the benefits provided to the weapons research, development and testing complex include: upgrade of x-ray characterization capabilities; support for larger diameter canisters *Deleted* power system upgrade to replace deteriorated underground systems; and upgrade of test site support facilities.

Our Restoration program which is coming to its conclusion met its objective of replacing the most deteriorated utilities and equipment to assure workload delivery schedules were achieved. Some specific examples of improvements made under Restoration include the retrofitting of a 1500 ton press. The press (Chart 18) used in many forming operations for production weapons components had little control of the pressing parameters. After retrofitting the press shown here (Chart 19), affords improved productivity due to the ability to program, adjust, and control pressing parameters. [CHARTS 18 & 19 DELETED]

Another accomplishment under the Restoration Program was the improvements to the centralized chilled water and brine system at the Y-12 Plant. Six additional central chilled areas were installed to provide the required cooling needed for production and support loads. This significantly improved the reliability, availability, and maintainability of the system while reducing maintenance and operating costs. The Chart (Chart 20) depicts one of the chillers replaced that ranged from 30-45 years old. Here is (Chart 21) one of the eight new chillers installed. These are just some of the many accomplishments under the Restoration Program. [CHARTS 20 & 21 DELETED]

FACILITIES CAPABILITY ASSURANCE PROGRAM

While not a new start, the importance of the ongoing Facilities Capability Assurance Program should be reemphasized. This program is designed to identify, manage, and correct long-term facilities deficiencies within a specified annual funding ceiling. We are requesting $79 million in FY 1989 to continue this critical program.

The production complex consists of more than 14.5 million square feet of building with over 70 miles of roads and 171 miles of fencing on more than 20,000 acres of land having a total estimated value in excess of $8.3 billion excluding capital equipment. More than 55 percent of the facilities were constructed in the 1940s and 1950s. Many of these facilities have reached or exceeded their reasonable life expectancy, are in poor condition, and/or functionally inadequate to meet modern weapons production requirements.

The Facilities Capability Assurance Program utilizes a documented, auditable appraisal program to identify poor physical conditions, functional inadequacy, and capacity and capability problems of facilities and utilities to meet current production complex program requirements.

REVITALIZATION

We are requesting no new construction projects other than the normal general plant project for research, development and testing. However, we would like to request your continued support for the ongoing Revitalization Program. Revitalization is the research, development and testing counterpart to production's Facility Capability Assurance Program. We are requesting $79 million to continue our FY 1988 revitalization project and provide the final year funding for the FY 1985 revitalization project.

Nuclear weapons research, development and testing requires highly specialized facilities to achieve progrmmatic goals. A decade of decline in the 1970s of advanced research, development and testing effort and minimal construction funding for the weapons research, development and testing complex created a backlog of critically needed facilities to replace aged facilities and to provide facilities which meet the technological need and standards for the mission of the 1980s and beyond. The research, development and testing complex covers 18 million square feet of facilities with an estimated replacement value of $7 billion. As seen in these charts (Chart 22A & B) we are requesting $105 million to continue ongoing programmatic construction to include the FY 1988 Revitalization Project.

RESEARCH, DEVELOPMENT, AND TESTING — PROGRAMMATIC PROJECTS
(DOLLARS IN MILLIONS)

PROJECTS		TEC	FY 1988 APPROPRIATION	FY 1989 REQUEST
88-D-105,	SPECIAL NUCLEAR MATERIALS R&D LABORATORY REPLACEMENT, LANL	$210.0	$10.0	$22.0
88-D-106,	REVITALIZATION, PHASE II, VARIOUS LOCATIONS	$317.3	$29.0	$72.4
86-D-104,	STRATEGIC DEFENSES FACILITY, SNLA	$ 70.0	$15.0	$ 3.2
86-D-105,	INSTRUMENTATION SYSTEMS LABORATORY, SNLA	$ 18.4	$ 8.0	$ 0.0
86-D-106,	LABORATORY DATA COMMUNICATIONS CENTER, LANL	$ 25.0	$12.2	$ 0.0

CHART 22A

RESEARCH, DEVELOPMENT, AND TESTING — PROGRAMMATIC PROJECTS (CONT'D)
(DOLLARS IN MILLIONS)

PROJECTS		TEC	FY 1988 APPROPRIATION	FY 1989 REQUEST
85-D-102,	REVITALIZATION, PHASE I, VARIOUS LOCATIONS	$156.5	$ 33.5	$ 6.8
84-D-107,	TESTING REVITALIZATION, VARIOUS LOCATIONS	$ 79.2	$ 5.5	$ 0.0
	TOTAL, RD&T PROJECTS		$113.2	$104.4

CHART 22B

ENVIRONMENT, SAFETY AND HEALTH

OVERVIEW

Over the past several years the Secretary has established initiatives to assure that the Department is operating its facilities safely, in an environmentally acceptable manner, and in compliance with the intent and spirit of applicable laws. There are two major thrusts to this program: to assure that the nuclear facilities are operated at a level of safety comparable to the privately licensed nuclear sector; and, to bring all the Department's facilities into compliance with environmental laws.

ACCOMPLISHMENTS

NUCLEAR SAFETY

During the past year there has been a major effort to improve the radiation protection programs at various plants in the weapons complex. This has been in the form of increased staffing and the initiation of construction of new facilities to improve the calibration of radiation instruments used in monitoring workers and to assure that contamination is not inadvertently tracked out of the plant. Construction of these facilities has started at our Rocky Flats, Y-12, and Pantex Plants. Safety Analysis Reports, comparable to Nuclear Regulatory Commission licensing reviews, were completed for the major plutonium operations buildings at Rocky Flats. We have made structural upgrades to class one plutonium handling buildings at the Rocky Flats complex. The upgrades to the buildings have significantly improved the safety status of the buildings.

ENVIRONMENTAL PROTECTION

Compliance with environmental laws remains a major issue in the weapons complex. Generally, compliance is not a matter of meeting specific standards. Rather, it involves a permitting process where the regulatory agency reviews a proposed action and either agrees with it or requires additional efforts. Over the past several years this process has been initiated at almost all the weapons complex sites. The Department's Rocky Flats Plant has a General Agreement in place with the Environmental Protection Agency and Colorado and is working on a detailed permit under the Resource, Conservation, and Recovery Act (RCRA) for the treatment and storage of hazardous and mixed wastes. Additionally, the Nevada Test Site has received interim approval for the storage of mixed waste and is negotiating for a permanent permit for disposal. Also, a permit to begin construction of the Tritium Loading Facility was issued by the Environmental Protection Agency under the radionuclide emission regulations of the Clean Air Act.

All sites have made substantial progress in conducting the assessments required by the Superfund Amendments and Reauthorization Act. All weapons complex sites were identified to the Environmental Protection Agency and are included in the Federal Docket which was mandated by the Superfund Amendments and Reauthorization Act. Because of the organics discovered in the groundwater, Livermore has been identified as a National Priority List candidate, and it is anticipated the other sites such as Y-12 and Rocky Flats may be placed in that category.

During FY 1988, major environmental improvements were completed at several of our sites. At the Y-12 Plant, a closed-loop cooling system to stop the discharge of plant process water to the storage drainage system was installed. Upgraded sewer lines and surface drainage deficiencies to prevent movement of soil surface contamination. Improvements to the air and water pollution systems were also completed to decrease mercury contamination in surface runoff and stream discharges. At our Kansas City Plant, a hazardous chemical storage system was constructed, and PCB-contaminated soils removed and the the waste water treatment facility was replaced. Additionally, the electrical equipment containing PCBs was replaced at several weapons complex sites.

MANAGEMENT INITIATIVES

Several management initiatives have been taken to make sure that nuclear safety improvements and compliance with environmental law is accomplished in a timely but cost effective manner. A decision by the Assistant Secretary for Defense Programs established a central office to budget for and manage an Environmental Restoration Program. This office will establish priorities, justify funding, and provide management for necessary remedial actions at all inactive waste sites subject to the Comprehensive

Environmental Response, Compensation, and Liability Act, and certain active waste sites which are subject to the Resource, Conservation, and Recovery Act, thereby, relieving the line program offices from having to duplicate these functions.

A long-range environmental safety and health (ES&H) planning system has been developed and implemented. An annual Environmental Safety and Health Program Review has been instituted as a mechanism to bring environmental safety and health managers from the DOE contractors and Headquarters and field operations together to identify cost effective corrective actions to environmental and safety concerns. This review brought together all levels of management within DOE to affect enhancements in this most important area.

As part of his new initiatives, the Secretary has established independent reviews of plant operations in Environmental Surveys, and Technical Safety Appraisals. The weapons complex is developing a system for field and Headquarters so that a fast action response to the Surveys and Appraisals can be provided, and the needed actions can be incorporated into the long-range planning or the next year's budget process. The weapons complex is also responding to outside independent reviews such as reviews by the National Academy of Sciences mandated by P.L. 100-180.

FY 1989 PROGRAM

Our FY 1989 Budget estimate related to environmental safety and health matters is approximately $252 million for the weapons program. In FY 1988 approximately $232 million is projected.

The base Environmental Safety and Health Program will continue at all plants in FY 1989 with the object of protecting the health and safety of the public and plant workers, protecting government property against damage by fire or accident, protecting the environment, and complying with applicable environment, safety, and health laws. The National Academy of

Sciences will conduct a review of the weapons complex to determine the safety of our sites and the environmental impact of our operations. This will require efforts to collect and assess data for the reviewers. Increased efforts will be mounted in nuclear safety, particularly with respect to occupational radiation protection and quality assurance. Extra work will continue in environmental protection to keep moving the weapons complex towards compliance with environmental laws. Most assessments will be completed and it is expected that these will indicate the need for greater and improved monitoring to assure compliance with the Resource, Conservation, and Recovery Act and the Clean Air Act. This will mean more groundwater wells, double lined disposal pits, and improved stack samplers and monitors. National Environmental Policy Act (NEPA) assessments will be completed for several facilities including the Decontamination and Waste Treatment Facility at Livermore, Building 371 at Rocky Flats, SDI facilities at various locations, and waste incinerators at various locations. Finally, a major campaign will be initiated to develop waste reduction techniques.

SAFEGUARDS AND SECURITY

ACCOMPLISHMENTS

We have continued to operate the weapons production complex in a secure manner. Even though there have been many demonstrations at our sites and much harassment of our courier force, there have been no significant security events. We have made significant progress in improving our protection of facilities, completing several major upgrade projects. Master Safeguards and Security Agreements with our key facilities have been signed or will be in the next few months. We have actively participated in the development of new and revised safeguards and security requirements, standards, and criteria. Our long-range security plan, which helps guide the weapons complex into the future has been updated and provided to the field activities.

FY 1989 PROGRAM

Included in our FY 1989 estimate is $396 million for Safeguards and Security. With these funds, we intend to maintain our excellent record of operating without any significant security incidents and we will continue to upgrade the security posture of our facilities. We will focus our efforts to complete Master Safeguards and Security Agreements with every facility and improve our program to counter the insider threat. I have initiated and will continue a program to analyze the Master Safeguards and Security Agreements and inspection reports for the purpose of improving our understanding of key, common security concerns and identifying effective solutions to difficult security problems. Through periodic security program reviews with the operations offices, I want to share these problems and solutions.

PROGRAM DIRECTION

The Weapons Program Direction budget request of $81.4 million (Chart 23) provides for Federal program direction and oversight of the Weapons and other Defense Programs activities at Headquarters, and at the Albuquerque and Nevada Operations Offices. The budget request provides for an increase of ten full-time Federal employees, for a total of 861 in fiscal year 1989. This activity also contains funding for contractual services and for the Community Assistance Program at Los Alamos, New Mexico.

PROGRAM DIRECTION
(DOLLARS IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROPRIATION	FY 1989 REQUEST
PROGRAM DIRECTION	$70.0	$74.8	$81.4

- PROVIDES FOR 861 FEDERAL FTE'S ($47.2M)
- PROVIDES FOR NEEDED CONTRACTUAL SERVICES ($25.0M)
- SUPPORTS THE LOS ALAMOS COMMUNITY ASSISTANCE PROGRAM ($9.2M)

CHART 23

7. SUMMARY

In summary, our request responds to the most critical national security requirements within the fiscal constraints agreed to by the Congress and the Administration in the recent budget summit. There are a number of national defense policy issues that both the Administration and Congress must respond to. In any event, for the foreseeable future nuclear deterrence will remain a cornerstone of our national defense strategy and a vital DOE weapons program will remain essential.

In closing, I would like to thank you for your strong support through the years and look forward to working with you this year and in the future.

STATEMENT OF JILL E. LYTLE
DEPUTY ASSISTANT SECRETARY FOR NUCLEAR MATERIALS
U.S. DEPARTMENT OF ENERGY

Mr. Chairman and Members of the Committee; I am Jill E. Lytle, Deputy Assistant Secretary for Nuclear Materials, within the Office of Defense Programs of the Department of Energy (DOE). It is my pleasure to provide testimony regarding the Department's budget request for the Nuclear Materials program in FY 1989. The responsibilities of my position include the production of nuclear materials for the nuclear weapons complex and the management and disposal of nuclear wastes from all of the Department's defense activities.

Nuclear materials production and defense waste management activities comprise a nationwide complex of nuclear production reactors, metal foundries, chemical processing plants and waste facilities that constitute a multi-billion dollar industry unto themselves. It is an industry with both unique hazards and important product requirements. The original technology and facilities for producing nuclear materials were placed in operation quickly in the 1940's to meet immediate military requirements. Most of the currently operating facilities were built in the 1950's and early 1960's. These dedicated facilities are the sole source of tritium and plutonium in the United States to meet national defense nuclear materials requirements. We, therefore, must always be mindful of maintaining the capability and reliability of these facilities while planning and developing new technologies and facilities to meet future requirements.

With your support we continually increased production in the early 1980's. We felt that Nuclear Materials Production (NMP) was back on the road toward reliable operation and sufficient capacities to meet defense requirements. However, the loss of C Reactor, the reduction in power level of the remaining SR reactors and the previous stand down of the N Reactor highlighted the fragility of the nuclear materials production complex.

It is very important to enhance our programs of productivity retention and improved facility maintenance as recommended in the National Academy of Sciences recent report on the production reactors. This will enable the program to maintain production capacity and capability. DOE and Congress must continue to work together to find solutions to the problems associated with these aging facilities and the increasingly stringent environmental, safety, and health and safeguards and security requirements.

Without these solutions or alternate sources for nuclear materials, the Nation's nuclear defense posture will be in jeopardy.

The level of activity in the Defense Waste and Environmental Restoration (DWER) program is increasing, requiring additional funding, due to the approaching completion of major facilities and the shift from storage to permanent disposal operations. The Department has made a commitment not to build new high-level waste storage tanks at the Savannah River Plant but to provide for a major waste immobilization facility, the Defense Waste Processing Facility (DWPF), as the appropriate step in moving towards geologic repository disposal. This plant is approximately 70 percent complete. The Waste Isolation Pilot Plant (WIPP) in New Mexico will demonstrate disposal of transuranic wastes. This facility is over 90 percent complete and is scheduled to begin operation in October of this year. In FY 1989, we have also provided funding for continuing design activities on the Hanford Waste Vitrification Plant (HWVP) in Washington which will provide for immobilization of wastes at the Hanford site. These facilities are all a part of the Defense Waste Management Plan submitted to Congress in June 1983.

Finally, Defense Programs is placing greatly increased emphasis on our obligations under the hazardous waste laws to cleanup environmental contamination at the defense production sites. Carried out in the past primarily as an overhead burden on our production operations, these important remedial actions have been elevated to full program status, as recommended by Congress, and now undergo explicit planning, budgeting and progress tracking.

(Chart 1) The Nuclear Materials FY 1989 request is $2.95 billion. This amount includes $2.01 billion for Nuclear Materials Production, and $0.94 billion for Defense Waste and Environmental Restoration.

OFFICE OF NUCLEAR MATERIALS
FY 1989 CONGRESSIONAL BUDGET REQUEST
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
NUCLEAR MATERIALS PRODUCTION	$1,848.2	$1,808.7	$2,016.8
DEFENSE WASTE AND ENVIRONMENTAL RESTORATION	701.5	895.3	936.5
TOTAL	$2,549.7	$2,704.0	$2,953.3

CHART 1

NUCLEAR MATERIALS PRODUCTION

INTRODUCTION

Goals

(Chart 2) The principal goal of the NMP program is to provide nuclear materials to meet national defense requirements. In addition, we must maintain adequate production capability and capacity, at the same time continuing to support essential environmental, safety, and health, and safeguards and security requirements.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
PROGRAM GOALS

- MEET NUCLEAR WEAPONS STOCKPILE MEMORANDUM (NWSM) AND OTHER NEAR-TERM OPERATIONAL REQUIREMENTS
- MAINTAIN BASIC PRODUCTION CAPABILITY AND CAPACITY
- CONTINUE TO OPERATE NUCLEAR MATERIALS PRODUCTION FACILITIES IN A SAFE, SECURE AND ENVIRONMENTALLY ACCEPTABLE MANNER

CHART 2

Nuclear Materials Requirements

The NMP program's primary responsibility is to meet the requirements for tritium, plutonium, and enriched uranium set forth in the Nuclear Weapons Stockpile Memorandum (NWSM) approved annually by the President. The President annually issues a National Security Directive approving the Nuclear Weapons Stockpile Plan and noting the planning projection as a point of departure for future stockpile plans. These forecasts are based on military needs of the Department of Defense (DOD) and DOE's ability to respond to these needs.

In addition to weapon requirements, the materials production complex also must satisfy the other government and civilian demands for nuclear materials. These total requirements are met from existing inventories, new production in our facilities, and through purchase of uranium enrichment services from the DOE Office of Uranium Enrichment. However, defense spending has been limited by the December 1987 budget "summit" between Congress and the Administration. This has led to a joint DOE and DOD effort, through the Nuclear Weapons Council, to define an integrated nuclear weapons program consistent with the budget ceiling. Analysis of the nuclear materials supply based on the revised force structure projections from DOD indicates that the need for new plutonium production is significantly reduced. As a result of the reduced requirements, a difficult decision had to be made to reduce the size of the materials production complex in a way that would assure its reliability and long-term capability.

N Reactor

(Chart 3) The N Reactor has operated since 1963 producing plutonium for both defense and reactor research and development, as well as byproduct steam for the generation of electricity. Since 1982, the reactor has played a key role in meeting the requirements for the production of weapon-grade plutonium. The reactor has been in a stand down condition since January 1987 so that the implementation of safety enhancements identified by the DOE and outside independent reviews could be accelerated.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
N REACTOR

- REACTOR HAS BEEN IN A STAND DOWN CONDITION SINCE JANUARY 1987 AND WAS SCHEDULED TO RESTART IN MARCH 1988
- REVISED FORCE STRUCTURE PROJECTIONS INDICATE NEED FOR PLUTONIUM IS SIGNIFICANTLY REDUCED
- REDUCED REQUIREMENT CAN BE MET BY SR PRODUCTION REACTORS AND THROUGH RECOVERY OF PLUTONIUM RESIDUES
- PLACING N REACTOR IN COLD STANDBY APPEARS TO BE MOST PRUDENT ACTION IN RESPONSE TO THIS REDUCTION IN MATERIALS REQUIREMENTS AND BUDGET CONSTRAINTS

CHART 3

Based on the latest plutonium production requirements, the Department felt that this demand could be met without the production of N Reactor. Therefore, the Department announced on February 16, 1988, its intention not to restart the N Reactor. The reactor will be defueled and placed in cold standby status. The Department will, however, complete the safety upgrades and reviews that are scheduled for completion prior to restart. These actions will allow the Department the option of restarting the reactor if national security requirements prompt an increased demand for plutonium and new production facilities are not available.

The majority of weapons production facilities are unique in the complex, and each is an essential element in the weapons production system. In the case of plutonium production, however, duplicate capability exists between the Savannah River Plant and the Hanford site. In the past, the capacity of both sites was needed to meet demand, and the redundancy also afforded greater assurance of a continued material supply at a time when aging of the reactor production facilities was becoming of more concern. Presently, however, a reduction of the plutonium production capacity through placing the N Reactor in cold standby is the most prudent action in response to the significant reduction in material requirements.

I will now briefly address the specific requirements for tritium, plutonium, and enriched uranium.

Tritium

The tritium in the weapons stockpile decays at the rate of about 5.5 percent per year. In order to maintain the effectiveness of the stockpile, the tritium components are exchanged and recycled. In addition to this recycle work, there are new weapons added to the stockpile that require tritium.

(Chart 4) This chart shows the cumulative new tritium which must be produced to satisfy all tritium demands, including decay and losses, through FY 1998. It is DOE policy to operate our production reactors to meet this tritium requirement before satisfying the requirements for other reactor products. This chart also indicates the annual equivalent full power reactors which must be used to meet these tritium requirements. The remaining capacity is used to produce plutonium. [CHART 4 DELETED]

Plutonium

(Chart 5) This next chart shows total amount of plutonium needed to satisfy the recently revised requirements and that expected to be available. The total current weapon inventory and production support pipeline contain [DELETED] of plutonium. Much of the plutonium required for building new warheads is obtained by reclaiming and recycling materials from the retired weapons returned by the DOD to the DOE. Material requirements which cannot be met from DOD returns or existing DOE inventories must be satisfied by new production. [CHART 5 DELETED]

Highly Enriched Uranium

(Chart 6) I also need to mention the supply of highly enriched uranium for U.S. weapons. The U.S. weapons program has operated within its existing inventory of enriched uranium for the last 24 years without having to obtain additional material from the uranium enrichment complex. This has been accomplished by recycling enriched uranium from retired warheads and using existing excess inventories. Although recycling continues, the current schedules for building and retiring warheads will make it necessary to purchase uranium to meet requirements in about FY 1992. [CHART 6 DELETED]

NAS Reactor Assessment

(Chart 7) In May of 1986, Secretary Herrington invited the National Academy of Sciences (NAS) and the National Academy of Engineering (NAE) to provide the Department with an independent assessment of safety and technical issues raised by the nuclear reactor accident at Chernobyl. The focus of this assessment was to be the Department's eleven Class A (greater than 20 MWt) reactors. This assessment was in addition to steps the Secretary had already initiated including:

- special safety review of the N Reactor;
- design review of the N Reactor and the Savannah River Plant reactors;
- accelerated Technical Safety Appraisals of the production reactors; and
- review by distinguished experts outside the Department to assess safety issues concerning N Reactor raised by Chernobyl accident.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
NATIONAL ACADEMY OF SCIENCES REPORT ON DOE PRODUCTION REACTORS

O PUBLISHED OCTOBER 1987

O 17 TECHNICAL RECOMMENDATIONS

- DOE TAKING ACTION ON ALL RECOMMDENDATIONS
- SPECIFIC IMPLEMENTATION PLAN UNDER REVIEW

O 4 SAFETY FRAMEWORK/3 SAFETY MANAGEMENT RECOMMENDATIONS

- POTENTIAL MAJOR LONG-TERM OPERATIONS AND RESOURCE IMPACTS
- EH ROLE EXPANDED, STRENGTHENED, AND MORE AUTONOMOUS
- OUTSIDE INDEPENDENT OVERSIGHT TO THE SECRETARY
- CONTRACTOR/LINE MANAGEMENT:EXPANDED AND STRONG TECHNICAL AND MANAGEMENT CAPABILITY

CHART 7

At the beginning of the NAS/NAE review, the Department requested that the review committee bring any matters of immediate concern to the Department's attention so that appropriate corrective action could be taken promptly. The review committee did this once during their review, notifying the Department by letter in March 1987 of concerns with the Emergency Cooling System at the Savannah River Plant. The Department immediately took action to further reduce the power of the Savannah River Plant reactors to about 50 percent from the 75 percent level previously established by the Department as a result of similar concerns.

The results of the NAS/NAE assessment of four production reactors were published in October 1987. The report entitled "Safety Issues at the Defense Production Reactors" contained a number of observations, conclusions, and recommendations regarding safety at these reactors as well as the Department's process for managing and implementing reactor safety.

Shortly after receiving the report, Secretary Herrington announced a number of actions to be taken to respond to the recommendations of the report including:

- establishment of an independent oversight panel;
- development of an action plan to strengthen DOE's internal safety oversight;
- development of an action plan for revising the DOE safety orders and standards; and
- development of an action plan to resolve each of the technical recommendations in the report

Of particular relevance to the technical recommendations are the conclusions and recommendations described under the "Technological Vigilance" issue in the DOE "Safety Framework" section of the NAS/NAE Report. The Department's production reactor operating contractors are undertaking aggressive programs to enhance the technical competence and capability devoted to the reactors as well as the experimental and analytical base to support reactor safety. The Department is also evaluating the actions needed to strengthen its own in-house technical capability to manage the safety of its own production reactors in addition to strengthening its separate oversight function.

DOE's implementation of a number of the technical recommendations must be closely integrated with the activities of the Assistant Secretary for Environment, Safety and Health (ASEH) in response to the recommendations in the DOE "Safety Framework" section of the NAS/NAE report; e.g., revisions of DOE orders and development of DOE policy planned or underway in the areas of emergency planning, aging, backfitting, training, incident analysis and trending, probabilistic risk assessment, and severe accidents.

During the review committee's activities from August 1986 through October 1987, the Department completed a number of its own reviews as I described earlier. As a result, ongoing and planned (but not yet initiated) programs were strengthened or accelerated and new programs were initiated at N Reactor and the Savannah River Plant reactors to further enhance safety understanding and the safety of these reactors. These include the Safety Enhancement Program and Accelerated Safety Enhancement Program for N Reactor and the Severe Accident Assessment Program and the Integrated Safety Evaluation Program for the Savannah River Plant reactors. The technical issues identified in the NAS/NAE report, for the most part, were being considered in these or other ongoing programs, and the observations and recommendations made by the committee will be of major assistance in improving and strengthening these programs. In many cases, relevant results from these programs were not available until after the review committee had completed its analysis of an issue. The existence of these comprehensive safety activities has enabled the Department, in many cases, to modify or refocus existing programs to address the NAS/NAE report recommendations rapidly and without the need for significant additional resources in the near term.

The NAS/NAE report contained no recommendations nor did DOE's review identify any technical issues warranting immediate corrective action or further restrictions over and above the power reductions implemented at the Savannah River Plant reactors as a result of uncertainties in the ability of the emergency cooling system to respond to a worst case loss-of-coolant accident.

Many of the activities involve potential future analyses, tests, upgrades, etc., which can only be fully defined after completion of earlier analyses, designs or tests. For example, scoping of the increased maintenance and modernization costs can only be done after definition of new programs, criteria and facilities, since these costs are so interrelated with existing modernization and plant maintenance planning and programs that a meaningful total or incremental cost cannot be identified.

It is expected, however, that further substantial increased effort will be required to support the NAS/NAE recommendations, similar to that experienced with the ongoing implementation of the initiatives to strengthen the Department's environmental, safety and health performance implemented earlier by Secretary Herrington.

Implementation of the recommendations has been given a high priority within the Department; therefore, the timely completion of many of the activities has been made possible through deferral of lower priority work. In fact, as the NAS/NAE review progressed and issues were identified, programs were often refocussed and modified to deal with the issue well before the report was completed and provided to DOE. As future budgets are defined and progress is made on improving the definition of required actions for implementation, the Department will update its plans periodically and track the implementation actions.

FY 1989 Budget Request

(Chart 8) Turning now to the FY 1989 budget, we are requesting slightly over $2 billion in support of NMP activities. This is approximately an 11 percent increase over FY 1988, but only a 9 percent increase for the 2-year period from FY 1987.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
LEAD TABLE
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
OPERATING EXPENSES			
REACTOR OPERATIONS	$ 572.7	$ 550.0	$ 604.0
PROCESSING OF NUCLEAR MATERIALS	453.1	475.7	511.7
SUPPORTING SERVICES	223.1	221.8	259.7
URANIUM ENRICHING	176.7	153.0	169.0
PROGRAM DIRECTION	22.5	24.0	28.4
TOTAL OPERATING	1,448.1	1,424.5	1,572.8
CAPITAL EQUIPMENT	104.3	91.3	102.5
CONSTRUCTION	295.8	292.9	341.5
TOTAL	$1,848.2	$1,808.7	$2,016.8

CHART 8

(Chart 9) Significant growth is included for environment, safety, and health activities. This increase is necessary to adequately address safety issues and to ensure compliance with applicable State and Federal regulations. Addressing the priority need to maintain adequate capability and capacity at our remaining reactors requires significant funding over current levels. The NMP program has had to take a hard critical look at core program activities to maintain fiscal constraint.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
CHANGES FROM FY 1988 APPROPRIATION
($ IN MILLIONS)

FY 1988 APPROPRIATION		$1,808.7
o ESCALATION		+ 42.7
o CORE PROGRAM		
- BASE ACTIVITIES	- 46.2	
- RESTORATION AND PRODUCTIVITY RETENTION	+ 12.2	
- SPECIAL ISOTOPE SEPARATION	+ 3.5	- 30.5
o ENVIRONMENTAL, SAFETY, AND HEALTH		+ 125.6
o SAFEGUARDS AND SECURITY		+ 2.8
o NEW PRODUCTION REACTOR		+ 40.0
o NAVAL REACTOR PROGRAM SUPPORT		+ 27.5
TOTAL FY 1989 REQUEST		$2,016.8

CHART 9

(Chart 10) The next chart shows a crosscut of our budget request broken down into important program activities. I will address each in detail.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
MAJOR ACTIVITIES
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
CORE PROGRAM			
BASE ACTIVITIES	$1,139.7	$1,014.9	$ 997.7
RESTORATION AND RETENTION	48.4	65.8	78.0
SPECIAL ISOTOPE SEPARATION	73.9	95.8	101.4
TOTAL CORE PROGRAM	1,262.0	1,176.5	1,177.1
ENVIRONMENT, SAFETY, AND HEALTH	272.2	301.8	434.6
SAFEGUARDS AND SECURITY	151.6	168.9	176.1
NEW PRODUCTION REACTOR	0	20.0	60.0
NAVAL REACTOR SUPPORT	162.4	141.5	169.0
TOTAL	$1,848.2	$1,808.7	$2,016.8

CHART 10

CORE PROGRAM

Base Activities

(Chart 11) The major component of our request is for base activities. Base activities include facilities that must continue to operate for the production of nuclear materials. Of the request, approximately $1 billion is needed to support base activities.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
BASE ACTIVITIES

o MAINTAIN BASIC PRODUCTION CAPACITY AND CAPABILITY THROUGH OPERATION OF:

- FEED PRODUCTION PLANTS AT FERNALD AND OAK RIDGE
- THREE SAVANNAH RIVER REACTORS
- PUREX PROCESSING PLANT AT RICHLAND, TWO PROCESSING CANYONS AT SAVANNAH RIVER, AND PROCESSING PLANT AT IDAHO
- SCRAP RECOVERY FACILITIES AT ALBUQUERQUE, OAK RIDGE, RICHLAND, SAN FRANCISCO, AND SAVANNAH RIVER
- SUPPORT FACILITIES AT IDAHO, OAK RIDGE, RICHLAND, AND SAVANNAH RIVER
- TECHNOLOGY DEVELOPMENT ACTIVITIES AT VARIOUS LOCATIONS

CHART 11

Meeting the objectives of the program requires operation of reactor feed materials facilities at Fernald and Oak Ridge; operation of the three Savannah River Plant reactors; operation of chemical processing facilities at the Savannah River Plant, Hanford, and Idaho Falls; ongoing technology development activities; and operation of utilities and other site support facilities. The program also supports processing of Naval and research and development reactor spent fuel returned to Idaho, recovery and processing of scrap nuclear materials to supplement new production, and other Department, government, and industry requirements.

Savannah River Plant Reactors

In FY 1989, three Savannah River Plant reactors (L, P, and K) will be operated to produce the necessary tritium and plutonium to support requirements. The C Reactor will remain in cold standby due to the unrepaired cracks in the reactor tank. The fuel fabrication facilities will operate on a single shift per day to support these reactors. These reactors are now operating at reduced power, but a major program is underway for return to full power operation.

Processing Operations

Processing of the reactor fuel and targets separates the plutonium and tritium into product form for use in nuclear weapons. Processing also includes the purification of scrap plutonium that is unavoidably generated in plutonium processing operations. Plutonium is processed in a vast complex of aging facilities, each of which plays a vital role in materials production. Maintaining and upgrading these facilities for long-term operation while at the same time continuing to meet production requirements is a special challenge. With the continued support of this Committee and with the sharing of similar processing capabilities between NMP and DOE's Office of Military Applications to our mutual benefit, we have been able to meet materials requirements. Continued upgrading of these processing facilities and preventive maintenance will be required to maintain processing capabilities and to deliver plutonium to our weapons program.

Fuel-grade plutonium for blending at the Savannah River Plant was recovered from N Reactor fuel processed in PUREX in FY 1987. The PUREX Plant is currently processing N Reactor fuel containing weapons-grade plutonium. This campaign will continue throughout FY 1988. The Plutonium Reclamation Facility (PRF) operated from July through December 1987 to process selected plutonium residues. Preparations are being made to operate the Remote Mechanical "C" (RMC) line to produce metal from the purified plutonium from PUREX and PRF operations. The RMC Line is expected to resume operations later in FY 1988, and the plutonium metal product will be shipped to the Rocky Flats Plant for weapons programs use.

As I stated above, production of plutonium in N Reactor is not required currently because of a significant reduction in plutonium requirements. However, even with N Reactor in cold standby, the processing facilities at Hanford must continue to be operated. From 1972 to 1983, the PUREX fuel processing facilities were in standby. Spent fuel discharged from N Reactor during this time was stored in cooling basins at Hanford where much of it remains today. About 1750 MT of fuel containing [DELETED] of fuel-grade plutonium, in addition to over 700 MT of fuel containing over [DELETED] of weapons-grade plutonium, is in storage and will be processed in the PUREX facility. In addition, with the placement of N Reactor in cold standby, the irradiated fuel still in the reactor will be discharged and processed. The weapons-grade plutonium will be separated and used without further processing in defense programs; the fuel-grade plutonium will be blended or processed in the Special Isotope Separation (SIS) facility to provide weapons-grade plutonium. The Plutonium Finishing Plant (PFP) will continue to operate to purify scrap plutonium generated in our scrap processing operations, and to convert the pure plutonium from scrap processing and from fuel processing to the required metal forms.

Restoration and Retention

(Chart 12) The potential for facility related production curtailments, such as those that have occurred during the past year, has been recognized for some time. Projects were initiated as early as FY 1981 to address the emerging problems of plant aging and marginal capacity. That advanced planning paid dividends. Thanks to production increases obtained through the L Reactor Upgrade, the Restoration of Production Capabilities, and other early projects, we have been able to meet the requirements placed on the complex the past few years.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
RESTORATION AND RETENTION
($ IN MILLIONS)

	TEC	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
FACILITY RESTORATION (82-D-124)	$ 364.7	$ 3.9	$ 10.6	$ 5.9
PRODUCTIVITY RETENTION (86-D-149)	410.4	44.5	55.2	72.1
TOTAL		$ 48.4	$ 65.8	$ 78.0

FACILITY RESTORATION

o COMPLETES UPGRADE OF FACILITIES TO MAINTAIN THE PRODUCTION OF NUCLEAR MATERIALS IN SUPPORT OF NATIONAL DEFENSE PROGRAMS.

PRODUCTIVITY RETENTION

o PROVIDES FOR MODERNIZATION AND UPGRADE OF EXISTING PRODUCTION FACILITIES TO INCREASE OPERATING AVAILABILITY AND/OR EFFICIENCY OF CRITICAL PRODUCTION COMPONENTS.

CHART 12

The problem of overtaxed, obsolete facilities is, however, not solved. Significantly more must be done if we are to continue to meet production requirements in the future.

The outyear supply projections that I showed earlier are based on the timely undertaking of a number of key projects. I would like to discuss these next.

The Productivity Retention Project is directed at two of our most immediate needs: improved plant operational availability and cost efficiency. The output of many of our facilities is declining due to excess maintenance downtimes. Old, worn-out equipment breaks and requires constantly increasing levels of repair. These repairs halt operations and inhibit production. In the case of nuclear facilities, even a minor breakdown can have a significant impact because of the decontamination that must be performed prior to an actual repair. Further, more stringent safety and environmental release regulations have come into effect since the plants were originally constructed. Meeting these new standards poses an interesting challenge to facilities built over 30 years ago.

The total cost of correcting these deficiencies and improving the efficiency of our principal facilities is estimated to be about $410 million. The project has been divided into four separately introduced phases in order to accommodate budget constraints. We are requesting approximately $72 million in FY 1989 to continue Phases I through III and initiate Phase IV.

While the Productivity Retention Project represents a substantial investment, the cost will more than be repaid through outyear savings. Without this project we will have to use high staffing levels and other uneconomic approaches that will drive up operating budgets.

The Facility Restoration Project was begun in FY 1981 and is the oldest of our three projects to maintain production capacity. It is now in the latter stages of construction. Over two-thirds of the subprojects have already been completed and, as mentioned previously, are contributing to our production output. Approximately $6 million is requested in FY 1989 to complete the final subprojects.

Special Isotope Separation (SIS)

(Chart 13) The SIS Project will provide a source of plutonium that is technological diverse from production reactors and independent of the issues associated with these reactors. SIS will also provide the flexibility to more readily respond to potential increases in the demand for weapon-grade plutonium.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
SPECIAL ISOTOPE SEPARATION
(IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
OPERATING EXPENSES	$ 48.3	$ 70.0	$ 72.3
CAPITAL EQUIPMENT	1.0	0.8	0.5
CONSTRUCTION (TEC $550M)	24.6	25.0	28.0
GPP	0	0	0.6
TOTAL	$ 73.9	$ 95.8	$ 101.4

- FY 1988 TO FY 1990-MAJOR DEFINITIVE DESIGN EFFORT
- FY 1988-DEFINE DESIGN BASIS FOR PROCESS AND FACILITIES
- FY 1988-SITE PREPARATION FOR CONSTRUCTION FOLLOWING EIS RECORD OF DECISION
- FY 1989-START CONSTRUCTION AND PROCUREMENTS FOLLOWING INTEGRATED VERIFICATION DEVELOPMENT DEMONSTRATIONS
- FACILITY CONSTRUCTION WILL NOT BEGIN UNTIL COMPLETION OF KEY DEVELOPMENT ACTIVITIES

CHART 13

SIS employs the Atomic Vapor Laser Isotope Separation (AVLIS) process, which utilizes laser energy to separate the isotopes of plutonium. More specifically, lasers are used to remove undesired minor isotopes from Government-owned plutonium to support defense applications. This process is being developed for the Department of Energy by the Lawrence Livermore National Laboratory.

The two major SIS activities are process development and production plant design and construction. Integrated demonstrations will include both full-power single isotope and reduced-power three isotope separations using plant scale equipment. These demonstrations will be supported by prototypic balance-of-plant plutonium processing. The Department has taken the position that substantial plant construction will not be initiated until completion of a review and assessment of demonstration program results.

As a result of Congressional support for the SIS project, the planned funding for FY 1988 was increased from $56.0 million to $95.8 million. The FY 1989 budget requests a total of $101.4 million to continue research and development on SIS technology and definitive design and engineering associated with the process and the production facility. In FY 1988, following the Environmental Impact Statement Record of Decision, preparation of the site for physical construction will begin. The start of construction for process facilities, as well as initiation of major long-lead procurements, is scheduled to begin in FY 1989 after key results are in from the development program. The current total estimated cost of the project is $550 million and a total project cost, which includes operating and support equipment, is approximately $1 billion.

ENVIRONMENT, SAFETY, AND HEALTH

(Chart 14) I would like to talk about what the NMP program is doing to support the Department's commitment to environment, safety, and health (ES&H). The Department's continuing policy is to conduct its operations in an environmentally safe and sound manner. DOE is committed to taking actions necessary to comply with applicable environmental statutes, regulations, and standards, while providing nuclear materials required for national defense. The FY 1989 Nuclear Materials Production budget request of $434.6 million for environmental, safety, and health activities demonstrates this emphasis and commitment.

NUCLEAR MATERIALS PRODUCTON
FY 1989 CONGRESSIONAL BUDGET REQUEST
ENVIRONMENT, SAFETY, AND HEALTH
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
OPERATING EXPENSES	$ 197.9	$ 207.1	$ 324.1
EQUIPMENT	21.6	22.4	34.2
CONSTRUCTION	52.7	72.3	76.3
TOTAL ES&H	$ 272.2	$ 301.8	$ 434.6

- SIGNIFICANT INCREASES ARE REQUIRED TO IMPLEMENT NAS/NAE TECHNICAL RECOMMENDATIONS
- INCLUDES INITIATION OF NEW AND ACCELERATION OF ONGOING REACTOR SAFETY PROGRAMS TO ENSURE SAFE OPERATION OF PRODUCTION REACTORS
- INCLUDES INCREASES FOR REGULATORY COMPLIANCE ACTIVITIES AT ALL SITES

CHART 14

Compliance actions are underway to meet the requirements of the Resource Conservation and Recovery Act, the Clean Air Act, the Clean Water Act, and the Comprehensive Environmental Response, Compensation and Liability Act. To assure efficient usage of limited resources to comply with the evolving multitude of Federal, State, and local environmental requirements, the Office of Nuclear Materials is preparing long-range plans to address ES&H concerns. The ES&H long-range plans will be updated on an annual basis to reflect changing requirements/operations and funding availability.

At the Feed Materials Production Center (FMPC), Fernald, Ohio, FY 1989 construction project efforts will: provide significant improvements in controlling water contamination; modify and upgrade facility ventilation systems and dust collection systems to reduce the risk of airborne contamination; provide for the improved control of on-site activities such as material handling systems that have potential for inadvertent contamination of personnel and the environment; and construct general health and safety improvements including an offsite emergency alarm system. DOE is aggressively pursuing assessment and planning efforts to determine needed corrective actions, and to develop a schedule for implementation and the associated funding required. Renovation activities for FMPC were initiated in FY 1982; however, the majority of the activities began in FY 1985 and will continue through the 1980's into the mid 1990's. DOE is preparing an environmental impact statement on renovation activities to obtain public input to assist DOE in its decision making process. It is DOE's goal to comply with applicable ES&H requirements for FMPC operations and to reduce operational risk and environmental releases to as low as reasonably achievable levels.

The production complex must operate in an environmentally acceptable manner while providing the nuclear materials required for national defense. The FY 1989 budget request for ES&H activities provides for long-term solutions for priority problem areas.

SAFEGUARDS AND SECURITY

(Chart 15) In FY 1989, we are requesting $176.1 million in safeguards and security funding to address essential needs. Our request includes only one new project for NMP, a security project at the Savannah River Plant which will provide protected areas for the 221-F and 221-H canyon buildings. The

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
SAFEGUARDS AND SECURITY
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
OPERATING EXPENSES	$ 116.0	$ 127.8	$ 126.2
EQUIPMENT	12.4	11.1	7.9
CONSTRUCTION			
GENERAL PLANT PROJECTS	2.6	4.4	6.6
84-D-134 SAFEGUARDS AND SECURITY IMPROVEMENTS, SR	11.5	9.7	11.6
84-D-137 FACILITY SECURITY SYSTEM UPGRADE, ID	0.3	0	0
86-D-156 PLANTWIDE SAFEGUARDS SYSTEMS, SR	8.8	13.0	12.8
88-D-153 ADDITIONAL REACTOR SAFEGUARDS, SR	0	2.9	5.7
89-D-140 ADDITIONAL SEPARATION SAFEGUARDS	0	0	5.3
SUBTOTAL CONSTRUCTION	23.2	30.0	42.0
TOTAL S&S	$ 151.6	$ 168.9	$ 176.1

protected areas will consist of an intrusion detection and assessment (IDA) zone and two entry control facilities for personnel access control.

[DELETED]

NEW PRODUCTION REACTOR (NPR)

(Chart 16) The Department's long-range plans for the production of special nuclear materials assume that the NPR and supporting facilities will replace existing production reactor capacity. The primary mission for an NPR would be to assure that goal quantities of tritium can be produced to sustain our nuclear weapons stockpile. The NPR would also be capable of producing plutonium, if this proves necessary.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
NEW PRODUCTION REACTOR
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
OPERATING EXPENSES	$ 0	$ 10.0	$ 25.0
88-D-154 DESIGN ONLY	0	10.0	35.0
TOTAL NPR	$ 0	$ 20.0	$ 60.0

- 0 REACTOR NEEDED TO ASSURE CONTINUED TRITIUM PRODUCTION CAPABILITY
- 0 PROJECT COST, SCHEDULE AND FUTURE FUNDING WILL BE DECIDED AFTER SELECTION OF PREFERRED REACTOR CONCEPT AND SITE
- 0 ERAB CONVENED TO STUDY POTENTIAL REACTOR TECHNOLOGIES, RESULTS EXPECTED JULY 1988

CHART 16

The funding granted by Congress for FY 1988 will permit studies of alternative sites and technologies for an NPR and preparation of a final report designating a preferred site and preferred technology. In FY 1988, we will also initiate the necessary environmental studies, leading to initiation of an Environmental Impact Statement for the NPR. The Department has asked the Energy Research Advisory Board to evaluate the alternative reactor technologies. The reactor technologies being reviewed for the NPR include: (1) Low-Temperature Heavy Water Reactor; (2) Light Water Reactor; (3) High-Temperature Gas-Cooled Reactor; and (4) Liquid Metal Reactor.

We have also established a Site Evaluation Team to evaluate alternative sites. The sites being considered for the deployment of an NPR include the three nuclear materials production sites presently involved in reactor operations and fuel processing. These are: (1) the Hanford Site, Richland, Washington; (2) the Idaho National Engineering Laboratory, Idaho Falls, Idaho; and (3) the Savannah River Plant, Aiken, South Carolina.

The findings of both the Energy Research Advisory Board and the Site Evaluation Team will be completed in FY 1988. A report to Congress providing the status of the site and technology evaluations will be provided in May 1988. A final report providing the Department's recommended acquisition strategy, including the preferred technologies and preferred sites, will be provided in July 1988. The final report will include the number of production reactors required and a time schedule for their acquisition, construction, and operation.

Safety will be a primary design consideration for the NPR and will be integrated early into the design. The underlying NPR safety philosophy will address both accident prevention and accident mitigation, including, where applicable, the ability of the containment structure to withstand severe accidents beyond the design basis. To ensure that the level of safety is achieved, an approach consistent with the Nuclear Regulatory Commission (NRC) safety review process and safety requirements and DOE orders will be used. This approach will result in a level of safety that meets or exceeds that afforded by licensed commercial power reactors.

The funding requested for FY 1989 will permit work on the EIS to proceed. The Department will also begin conceptual studies for an NPR in FY 1989 in accordance with the acquisition strategy to be reported to Congress in

FY 1988. Cost studies will also be completed to provide a firmer estimate of project cost. Current estimates for cost are 3 to 5 billion dollars. Schedule estimates will also be refined. The current completion target date is 1998.

NAVAL REACTORS SUPPORT

(Chart 17) The Nuclear Materials Production program budgets for the separative work to produce highly enriched uranium from the Department's gaseous diffusion complex for the Naval Reactors program. In FY 1989, the Naval Reactors program requires [DELETED] of uranium. This highly enriched uranium will be used for fabrication of naval propulsion reactor cores and to continue naval fuel production in the new facility at the Savannah River Plant. The total FY 1989 Naval Reactor support request is $169 million. These funds reflect a [DELETED] decrease from the FY 1988 request. The cost of the uranium to be provided to Naval Reactors is dependent on the separative work price charged by the Office of Uranium Enrichment. The proposed price for FY 1989 is 60 percent higher than the FY 1988 price.

NUCLEAR MATERIALS PRODUCTION
FY 1989 CONGRESSIONAL BUDGET REQUEST
NAVAL REACTOR SUPPORT
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
NAVAL REACTOR PROGRAM SUPPORT	$ 162.4	$ 141.5	$ 169.0

Deleted

CHART 17

NEW SAVANNAH RIVER PLANT OPERATING CONTRACTOR

On October 29, 1987, the Du Pont Company notified DOE that it would not continue operations at SRP after its current contract expires on September 30, 1989. Secretary of Energy Herrington has decided that DOE will have a single contractor operate its SRP and has initiated source selection process. We are currently in the process of estimating incremental FY 1989 funding requirements to cover "one-time" pension and other benefit costs incurred as a result of contract termination. The Department is still considering a plan to address these costs.

SUMMARY

In summary, there are a number of challenges currently facing the Nuclear Materials Production Complex:

- o Maintaining production in aging facilities including those undergoing renovation and major safety upgrades;
- o Maintaining required production levels within constrained budgets while accommodating increased ES&H and safeguards and security funding needs; and
- o Developing sufficient budget and support to begin and sustain new initiatives required to assure a viable production complex into the next century.

We are taking aggressive actions to meet these challenges and look forward to the continued close communication with and support of the Congress which is essential to the success of these actions.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION PROGRAM

INTRODUCTION

Goals

(Chart 18) The Defense Waste and Environmental Restoration (DWER) program's principal goal is to provide essential support for nuclear materials production requirements through the safe and environmentally acceptable management of radioactive and hazardous wastes.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION FY 1989 CONGRESSIONAL BUDGET REQUEST

PROGRAM GOALS

- SUPPORT NUCLEAR MATERIALS PRODUCTION REQUIREMENTS
- MAINTAIN BASIC CAPABILITY AND CAPACITY
- CONTINUE IMPLEMENTATION OF DEFENSE WASTE MANAGEMENT PLAN
- SUPPORT ENVIRONMENTAL RESTORATION ACTIVITIES AT ALL DP FACILITIES

CHART 18

The DWER program must maintain the capability and capacity to manage these wastes in a routine, safe, and cost-effective manner. The program also ensures the availability of safe, secure, and efficient means of transporting radioactive and hazardous materials. Substantial resources are also called out for environmental restoration; i.e., investigation and remediation of environmental contamination at presently inactive Defense Programs sites. The goals are to achieve compliance requirements of applicable laws and regulations.

In June 1983, the President submitted to you the Defense Waste Management Plan which provided a baseline for permanent disposal of high-level waste and transuranic waste. Our FY 1989 programs continue implementation of that Plan.

The key provisions of the Plan included: (1) construction and operation of the Defense Waste Processing Facility (DWPF) at the Savannah River Plant; (2) construction of the Waste Isolation Pilot Plant (WIPP) located near Carlsbad, New Mexico, and performance of research and development for demonstration of geologic disposal of transuranic waste; (3) the construction and operation of the Hanford Waste Vitrification Plant (HWVP) to process high-level waste at Hanford for disposal in a Federal geologic repository; and (4) construction and operation of transuranic waste processing facilities at the Richland, Savannah River, Oak Ridge, and Idaho sites, so that transuranic waste from those sites may be certified and shipped to WIPP.

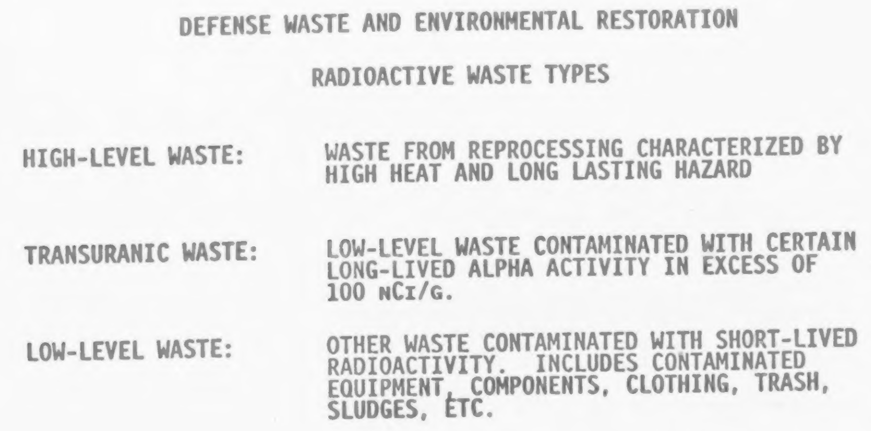
Implementation of the Defense Waste Management Plan requires additional operating funds in FY 1989. The continuation of construction and startup activities at the DWPF and the operation of the WIPP facility, beginning in October 1988, result in increased fiscal needs in FY 1989. I will talk about our specific site plans in just a moment.

The decision in 1983 to move from interim waste management to terminal disposal was sound and prudent. Implementation of this plan, however, led to minimizing expenditures for interim waste management facilities. Timely startup of new facilities which will support disposal, such as the DWPF, is clearly necessary to support continued production of nuclear materials.

RADIOACTIVE WASTE INVENTORIES

Radioactive Waste Types

(Chart 19) Radioactive wastes are primarily of three types--high-level, transuranic, and low-level--and are generated by DOE defense activities, the Naval nuclear propulsion program, and other DOE research and development work.



DEFENSE WASTE AND ENVIRONMENTAL RESTORATION

RADIOACTIVE WASTE TYPES

HIGH-LEVEL WASTE:	WASTE FROM REPROCESSING CHARACTERIZED BY HIGH HEAT AND LONG LASTING HAZARD
TRANSURANIC WASTE:	LOW-LEVEL WASTE CONTAMINATED WITH CERTAIN LONG-LIVED ALPHA ACTIVITY IN EXCESS OF 100 nCi/g.
LOW-LEVEL WASTE:	OTHER WASTE CONTAMINATED WITH SHORT-LIVED RADIOACTIVITY. INCLUDES CONTAMINATED EQUIPMENT, COMPONENTS, CLOTHING, TRASH, SLUDGES, ETC.

CHART 19

High-Level Waste

High-level waste is, in general, highly radioactive liquid waste resulting from plutonium production and enriched uranium recovery operations at the Savannah River Plant, Idaho, and Richland. Our objective is to achieve disposal of high-level waste by immobilization, shipment to, and disposal in a commercial geologic repository. Due to successful evaporation and concentration efforts at Hanford and the Savannah River Plant, the actual volume of stored high-level waste has increased by only about 3.7 million gallons, despite higher generation rates. Such efforts help to minimize the need for new interim waste storage tanks pending operation of immobilization facilities.

Transuranic Waste

Transuranic waste contains the long-lived, radioactive elements beyond uranium in the periodic table. The principal element in such waste is plutonium. The DOE orders allow other radionuclides to be managed as transuranic waste if the potential long-term hazards indicate that such management is warranted. The objective of the plan with regard to transuranic waste is to end interim storage and demonstrate disposal in the WIPP.

Low-Level Waste

Low-level waste is radioactive waste not classified as high-level waste, transuranic waste, or spent nuclear fuel. The Department generated and disposed of about 97,000 cubic meters of this waste during the past year.

Waste Inventories

(Chart 20) Defense Waste and Environmental Restoration manages the disposed and stored defense nuclear waste. The next chart shows the volume of waste that has been generated from almost 40 years of nuclear materials production activities.

We are generating increasing quantities of high-level waste in the Nuclear Materials Production program. In addition, production activities added about 6,000 cubic meters of transuranic waste during the past year.

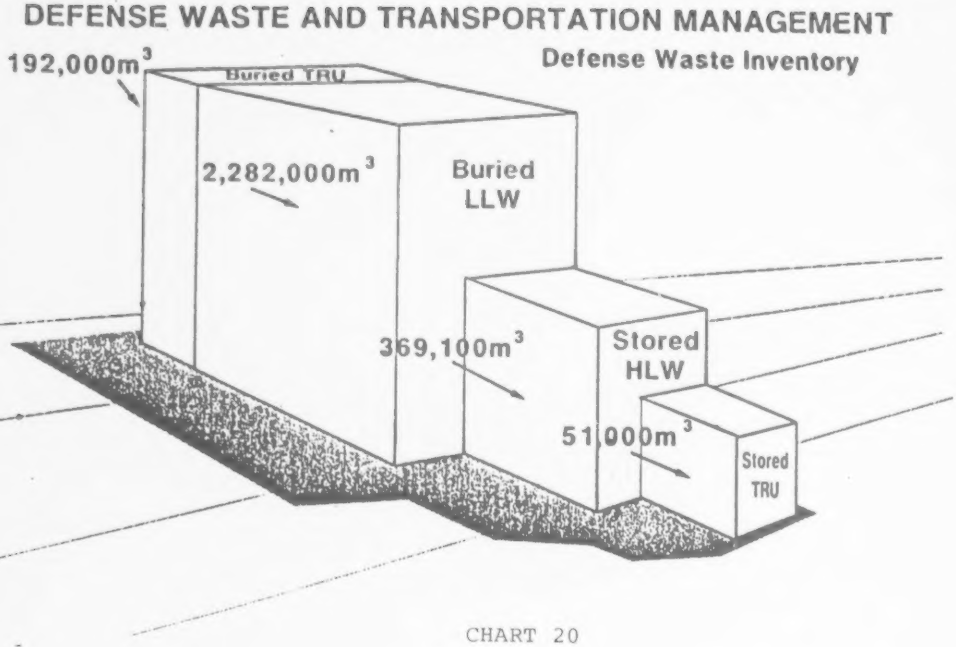


CHART 20

FY 1989 BUDGET REQUEST

(Chart 21) I would now like to address FY 1989 funding needs. Our request for FY 1989 is $936.5 million, a 5 percent increase over FY 1988.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
LEAD TABLE
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
OPERATING EXPENSES			
ENVIRONMENTAL RESTORATION	$ 53.8	$ 97.8	$ 120.9
WASTE OPERATIONS AND PROJECTS	319.8	411.6	532.0
WASTE RESEARCH AND DEVELOPMENT	68.1	51.1	58.5
HAZARDOUS WASTE COMPLIANCE TECHNOLOGY	7.6	7.1	8.4
TRANSPORTATION MANAGEMENT	8.5	8.4	9.7
PROGRAM DIRECTION	2.1	2.5	3.1
TOTAL OPERATING EXPENSES	459.9	578.5	732.6
CAPITAL EQUIPMENT	38.3	43.7	52.7
CONSTRUCTION	203.3	273.1	194.2
SUBTOTAL	$ 701.5	$ 895.3	$ 979.5
USE OF PRIOR YEAR BALANCES	0	0	-43.0
TOTAL	$ 701.5	$ 895.3	$ 936.5

CHART 21

(Chart 22) The next chart depicts the impact that these major program components have on the total budget. Our operating expenses are increasing because we are adding a new dimension to our program--startup of DWPF in FY 1990 to process high-level waste for disposal and startup of WIPP in FY 1989 to demonstrate disposal of transuranic waste. We will continue to effectively manage wastes at all Defense Programs sites, and continue to progress in the development, construction, and operation of facilities outlined in the Defense Waste Management Plan, such as the HWVP. We are also increasing Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Conservation and Liability Act (CERCLA) hazardous and mixed waste compliance actions.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
CHANGES FROM FY 1988 APPROPRIATION
($ IN MILLIONS)

FY 1988 APPROPRIATION		$895.3
o ESCALATION		+ 24.4
o ENVIRONMENTAL RESTORATION		+ 19.4
o WASTE OPERATIONS AND PROJECTS		
- DEFENSE WASTE PROCESSING FACILITY	$- 10.5	
- WASTE ISOLATION PILOT PLANT	+ 25.6	
- HANFORD WASTE VITRIFICATION PLANT	+ 18.5	
- OTHER OPERATIONS AND PROJECTS	- 2.9	+ 30.7
o WASTE RESEARCH AND DEVELOPMENT		+ 7.7
o HAZARDOUS WASTE COMPLIANCE TECHNOLOGY		+ 0.5
o TRANSPORTATION MANAGEMENT		+ 1.0
o PROGRAM DIRECTION		+ 0.5
SUBTOTAL		$979.5
PRIOR YEAR BALANCES		-43.0
TOTAL		$936.5

CHART 22

(Chart 23) I have included this next chart to show funding for the major program activities within DWLR. I will now describe each of these activities in more detail.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
MAJOR ACTIVITIES
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
ENVIRONMENTAL RESTORATION	$ 53.8	$ 97.8	$ 120.9
WASTE OPERATIONS AND PROJECTS			
DWPF	186.6	217.0	210.2
WIPP	23.4	85.7	113.1
HWVP	0	7.5	26.0
ALL OTHER	349.1	414.5	424.1
	$ 559.1	$ 724.7	$ 773.4
WASTE RESEARCH AND DEVELOPMENT	69.7	52.4	62.1
HAZARDOUS WASTE COMPLIANCE	7.8	9.0	9.8
TRANSPORTATION MANAGEMENT	9.0	8.9	10.2
PROGRAM DIRECTION	2.1	2.5	3.1
SUBTOTAL	$ 701.5	$ 895.3	$ 979.5
USE OF PRIOR YEAR BALANCES	0	0	-43.0
TOTAL	$ 701.5	$ 895.3	$ 936.5

CHART 23

ENVIRONMENTAL RESTORATION

(Chart 24) In FY 1989, the Environmental Restoration Program is requesting $120.9 million. This program was initiated by Congressional action in the FY 1988 budget, based mainly on the consolidation of funding which had been planned for remedial action activities under several Defense Programs offices. The objectives of the Environmental Restoration Program are to identify, characterize and restore all inactive waste sites at Defense Programs installations and to ensure compliance with applicable laws and regulations in the remediation of these waste sites. Many remedial actions at DOE sites have been incorporated into strict compliance schedules through either the RCRA permitting process or through consent orders and compliance agreements with the Environmental Protection Agency and State regulators. Cleanup of the balance of the inactive sites must be performed under the requirements of the CERCLA.

ENVIRONMENTAL RESTORATION
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
REMEDIAL ACTIONS	$ 37.7	$ 80.9	$ 104.2
DECONTAMINATION AND DECOMMISSIONING	16.1	16.9	16.7
TOTAL	53.8	97.8	120.9

- o CONTINUE WASTE SITE CHARACTERIZATION STUDIES AS DIRECTED BY CONSENT ORDERS AND COMPLIANCE AGREEMENTS AT HIGHEST PRIORITY DP SITES
- o INITIATE REMEDIAL ACTION DESIGN FEASIBILITY STUDIES AS DIRECTED BY CONSENT ORDERS AND COMPLIANCE AGREEMENTS AT PRIORITY DP SITES
- o INITIATE SITE REMEDIATION ACTIVITIES AND INTERIM MITIGATIVE MEASURES IN ACCORDANCE WITH APPROVED PLANS UNDER REGULATORY ORDERS AND COMPLIANCE AGREEMENTS AT DP SITES
- o COMPLETE HIGHEST PRIORITY DEFENSE D&D EFFORTS

CHART 24

The Environmental Restoration Program includes three phases which tie to the CERCLA requirements: (1) preliminary assessments and site inspections, (2) remedial investigations and feasibility studies, and (3) remedial actions. Included as a part of this program are the Defense surplus facility decontamination and decommissioning program and remediations associated with pre-1970 buried suspect transuranic wastes at Defense Programs facilities.

In FY 1989, the Preliminary Assessment/Site Investigation phase of the program will focus on newly prioritized sites, including the pre-1970 buried suspect transuranic waste sites at Idaho. Most of the other Defense Programs sites will have completed this preliminary phase during FY 1988, as required by the CERCLA amendments.

The Remedial Investigation/Feasibility Study phase of the program will focus on continuing the investigations of the highest priority Defense Programs sites and initiating feasibility studies of alternative remedial action designs as directed by consent orders and compliance agreements.

Subsurface investigation of the Idaho pre-1970 buried suspect transuranic waste sites will continue, as will investigation of Hanford inactive waste sites, including characterization of the single-shell tank farms. At Oak Ridge National Laboratory, investigation of the main site, solid waste storage areas, hydrofracture facility and offsite contamination areas will continue. Remedial action waste cleanup design will be initiated at the Feed Materials Production Center as required under the consent order and compliance agreement.

Characterization of the Chestnut Ridge and Bear Creek Valley disposal areas at the Oak Ridge Y-12 Plant will continue as required under the plant RCRA permit. At the Savannah River Plant, development of closure plans and remedial action design efforts will continue for the mixed waste burial grounds and seepage basins, as required by RCRA permit provisions. Remedial investigation implementation will continue at Rocky Flats, Sandia Livermore, Pantex, Kansas City, Pinellas, Los Alamos, Sandia Albuquerque, and Mound. The Lawrence Livermore Laboratory main site and Site 300 remedial investigations and feasibility studies will continue on a schedule consistent with the State compliance order. A final EIS on the surplus production reactor decommissioning project at Hanford is also planned for FY 1989. These reactors were shut down between 1964 and 1971.

Site remediation activities will be implemented in FY 1989 at the most urgently needed locations with consideration of site readiness for corrective actions. Interim mitigation measures at the buried suspect transuranic waste sites at Idaho will be continued, and remedial actions will be initiated at the Idaho central facilities and chemical processing plant disposal areas in accordance with the consent order and compliance agreement. The closure demonstration for an Oak Ridge National Laboratory solid waste storage area will be continued as will interim maintenance and stabilization actions for the Feed Materials Production Center waste pits and silos. At the Oak Ridge Y-12 Plant, closure activities including installation of caps for land disposal units will continue. Interim remedial actions at Hanford will continue, including single-shell tank stabilization and isolation, and the decommissioning of the 105F reactor building at Hanford will be initiated. At Lawrence Livermore Laboratory, construction will be completed on an extraction and treatment facility for reclamation of contaminated groundwater both on and offsite, in accordance with the State compliance order. Earth work at the Grand Junction site will be initiated in FY 1989. In addition, development of innovative clean-up technology will be pursued in cooperation with the Environmental Protection Agency and the Department of Defense under the Superfund Innovative Technologies Program.

Under the Environmental Restoration Program, Defense Programs is focusing significant resources to assure that previously uncontrolled hazardous and radioactive substance release sites are eliminated or are reduced to prescribed levels. Since these remedial actions are conducted under schedules established by law and at many sites also through consent orders and compliance agreements, it is critical that support for these important environmental activities be continued.

WASTE OPERATIONS AND PROJECTS

The principal objectives of this program are the safe and environmentally acceptable management of existing and newly generated waste from nuclear materials production; weapons production, research, development and testing; the naval nuclear propulsion program; and implementation of processing and disposal activities for high-level and transuranic waste.

The program includes the operation and maintenance of high-level waste storage tanks, bins, and related processing and storage facilities at Richland, the Savannah River Plant, and Idaho; the operation and maintenance of low-level waste burial grounds at the Savannah River Plant, Oak Ridge, Idaho, Richland, Los Alamos National Laboratory, Sandia National Laboratory, and the Nevada Test Site; and the retrievable storage of transuranic waste at various sites. In addition, the program is responsible for the construction and operation of facilities to prepare transuranic waste and high-level waste for disposal.

At INEL in FY 1989, high-level waste management activities, primarily in support of the Naval nuclear propulsion program, will continue. Planned maintenance of the New Waste Calcining Facility (NWCF) was completed in FY 1987 and the facility has been operating since to solidify the backlog of liquid waste stored in tanks.

Construction of the Processing Experimental Pilot Plant (PREPP) has been completed. PREPP will process transuranic waste prior to certification for emplacement in the WIPP and is still undergoing testing. In its third full year of operation, the Stored Waste Examination Pilot Plant, INEL's transuranic waste examination and certification facility, will examine 5,000 drums of waste to assure a backlog of certified waste for WIPP when it opens in FY 1989.

Defense Waste Processing Facility

(Chart 25) Our request for FY 1989 for the DWPF operations and construction is $210.2 million with an additional $3.8 million for supporting research and development activities. The DWPF will immobilize defense high-level waste at Savannah River for storage, and eventual transportation to, and disposal in a geologic repository. The radioactive fraction of the high-level waste will be immobilized directly in borosilicate glass. The decontaminated salt fraction of the waste will be solidified as saltstone and disposed of at the Savannah River Plant as a low-level waste. When the DWPF is operational in late FY 1990, we will begin to work off the backlog of high-level waste from production operations at the Savannah River Plant, reaching a steady-state operation in about 15 years. DWPF saltstone facility operations will commence in late FY 1988.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
DEFENSE WASTE PROCESSING FACILITY
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
WASTE OPERATIONS AND PROJECTS	$ 186.6	$ 217.0	$ 210.2
WASTE RESEARCH AND DEVELOPMENT	7.4	2.8	3.8
	$ 194.0	$ 219.8	$ 214.0

- CONTINUATION OF PREOPERATIONAL ACTIVITIES INCLUDING OPERATIONAL READINESS REVIEWS, LEADING TO OPERATIONS IN FY 1990
- CONTINUE OPERATION OF SALTSTONE PLANT
- PROVIDE OPERATIONAL AND LABORATORY SUPPORT
- CONTINUE OPERABILITY TESTING TO CONFIRM DESIGN CRITERIA
- BEGIN OPERATION OF 1/10 SCALE DWPF MELTER AND OFF-GAS SYSTEM TO CONDUCT INTEGRATED PROCESSING AND SYSTEMS TESTING DEMONSTRATION

CHART 25

In FY 1989, preoperational activities will continue at an increased pace in anticipation of FY 1990 vitrification facility operation. These preoperational activities include equipment and process development and testing; training and preparation of technical manuals; and operability testing of equipment. Also in FY 1989, operation of the DWPF saltstone facility will continue. FY 1989 will represent the first full year of saltstone facility operation, and preoperational activities at the vitrification facility will continue leading to operation in late FY 1990.

It is essential that the current schedule for DWPF be maintained. Double-shell tank space for newly generated high-level waste is very limited, and we must continue to remove waste from the old tanks before problems develop. Delay in the DWPF project, including the start of saltstone operations, will adversely impact our ability to support nuclear materials production.

Waste Isolation Pilot Plant

(Chart 26) We are requesting $113.1 million for the first year of WIPP operations in FY 1989 with an additional $19.2 million for supporting research and development activities. The WIPP is a research and development facility to demonstrate the safe disposal of radioactive waste from national defense programs. The WIPP is authorized by Public Law 96-164 and is exempt from licensing by the Nuclear Regulatory Commission. Consistent with the stipulated agreement between New Mexico and the DOE, this request includes $43.0 million for improvements to the roads which would be used to transport transuranic waste to WIPP.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
WASTE ISOLATION PILOT PLANT (WIPP)
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
WASTE OPERATIONS AND PROJECTS	$ 23.4	$ 85.7	$ 113.1
WASTE RESEARCH AND DEVELOPMENT	16.1	20.9	19.2
	$ 39.5	$ 106.6	$ 132.3

- RECEIVE AND EMPLACE WASTE
- CONTINUE RESEARCH AND DEVELOPMENT PROGRAM
- CONTINUE PERFORMANCE ASSESSMENT ACTIVITIES
- IMPROVE WIPP ROADS

CHART 26

The primary objective of WIPP is to demonstrate the technical and operational methods for permanent isolation of defense transuranic waste. The facility is designed to receive, inspect, emplace, and store defense waste. It will have the capability of disposing of defense transuranic waste and the Department will evaluate the feasibility of conducting experiments with defense generated high-level waste.

The construction of permanent surface and underground facilities started in July 1983 and operationally critical facilities was completed in FY 1988. Transuranic waste is now being certified for compliance with the WIPP waste acceptance criteria and stored for eventual shipment to the WIPP beginning in October 1988. After a 5 year demonstration period, a decision will be made to leave or retrieve the transuranic waste.

In FY 1988, the preoperational activities such as environmental permitting, operational readiness reviews and final assembly of the first NRC certified Transuranic Waste Package Transporters (TRUPACTs) will be completed. The TRUPACT will be used to transport transuranic waste to WIPP. During FY 1989 transuranic waste will be emplaced in WIPP to begin the 5 year demonstration period.

Certain highways in New Mexico have been designated as transportation routes for waste destined for WIPP. In 1982, the state identified which of these roads required improvements. In 1987, the state identified the need for the construction of new roads in New Mexico, along the designated WIPP transportation routes, to provide relief routes away from frequently traveled existing highways and provide bypasses around congested urban areas. Specific new roads have been proposed by the New Mexico State Highway Department.

Support will continue for the State of New Mexico's Environmental Evaluation Group to assure that the concerns of the people of that State are addressed.

(Chart 27) Included on the critical path for initiation of hot operations of WIPP in October 1988 is legislation to permanently withdraw WIPP land from public use. The legislation, introduced by the New Mexico Congressional delegation, is expected to be passed by Congress prior to October 1988.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
WIPP LEGISLATIVE LAND WITHDRAWAL

- CRITICAL PATH FOR HOT OPERATIONS - OCTOBER 1988
- LAND WITHDRAWAL BILL INTRODUCED BY NEW MEXICO CONGRESSIONAL DELEGATION
  - SENATE HEARINGS OCTOBER 1987
  - HOUSE HEARINGS DECEMBER 1987
- LEGISLATION MAY BE HELD UP UNTIL THE FOLLOWING ISSUES ARE RESOLVED:
  - BRINE INFLOW (NAS EVALUATION TO BE SUBMITTED TO CONGRESS BY MARCH 1, 1988)
  - NEW MEXICO REQUEST FOR ROAD FUNDS
  - MINERAL LEASES

CHART 27

Hanford Waste Vitrification Plant (HWVP)

(Chart 28) The proposed HWVP will incorporate high-level waste in borosilicate glass for permanent disposal in a Federal geologic repository. It serves the same function and is based on the same process technology as the DWPF now under construction at the Savannah River Plant except that an existing facility (B-Plant) will be used to decontaminate salt and process it for disposal onsite. While some refinements and testing are needed, the

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
HANFORD WASTE VITRIFICATION PLANT
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
WASTE OPERATIONS AND PROJECTS	$ 0	$ 7.5	$ 26.0
WASTE RESEARCH AND DEVELOPMENT	14.8	6.9	7.4
TOTAL	$ 14.8	$ 14.4	$ 33.4

- CONTINUE TITLE I ENGINEERING AND DESIGN
- CONTINUE PROCESS DEVELOPMENT AND ENGINEERING SUPPORT
- HOT OPERATIONS SCHEDULED FOR FY 1999

CHART 28

basic technology for vitrification of Hanford's high-level waste is in hand, and facility design and construction can be undertaken with confidence.

The broad scope of the Hanford Defense Waste EIS includes NEPA documentation for the HWVP. The record of decision, based on the EIS, will provide the basis for vitrification of high-level waste, onsite disposal of decontaminated salt immobilized in concrete, and disposal of previously separated and encapsulated cesium and strontium. The EIS was published in December 1987. Any additional NEPA documentation determined to be needed will be issued prior to the start of construction scheduled for late FY 1990.

The conceptual design was completed in the first quarter of FY 1988. Title I design will continue in FY 1989 as will support activities in the areas of technology development and demonstration for feed preparation, glass formulation, and equipment and systems testing; technology transfer from the DWPF and WIPP projects; and participation in the National program to qualify vitrification waste forms for disposal in a Federal repository.

Technical exchanges will continue with the PAMELA project in the Federal Republic of Germany, which has an operating high level waste vitrification melter.

The current plan is to begin construction in FY 1990 and commence hot startup in FY 1998. The current total estimated cost for the HWVP is $920.0 million.

WASTE RESEARCH AND DEVELOPMENT

(Chart 29) The Waste Research and Development program addresses the long-term management of defense radioactive wastes. The program consists of developing technologies for each waste type and assessing the associated hazards, costs, and environmental impacts of selection and implementation of long-term disposition alternatives. We are requesting $62.1 million for this important effort in FY 1989.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
WASTE RESEARCH AND DEVELOPMENT
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
OPERATING EXPENSES	$ 68.1	$ 51.1	$ 58.5
CAPITAL EQUIPMENT	1.6	1.3	3.1
CONSTRUCTION (INCLUDING GPP)	0.0	0.0	0.5
	$ 69.7	$ 52.4	$ 62.1

- DWPF SUPPORT FOR FY 1990 HOT OPERATION
- HWVP R&D, DESIGN, AND SUPPORT
- TERMINAL STORAGE R&D AND DEMONSTRATION
- TECHNICAL SUPPORT FOR HIGH-LEVEL, LOW-LEVEL, TRANSURANIC AND CHEMICAL WASTES

CHART 29

High-Level Waste Technology

We are developing technology that supports the long-term management of defense high-level waste at DOE sites. Our first emphasis is to support the DWPF at the Savannah River Plant, with the outyear emphasis shifting to the HWVP at Richland. The focus in FY 1989 is on waste form qualification for acceptance at a Federal geologic repository, including continuation of large-scale leaching tests and in-situ tests of simulated high-level waste in the WIPP. At the INEL, the feasibility of volume reduction process concepts for the calcined Idaho high-level waste is being evaluated.

During FY 1989, technical support for waste acceptance will include the development of the DWPF Waste Qualification Report which provides the data to show compliance with the Waste Acceptance Preliminary Specifications.

Transuranic Waste Technology

The basic purposes of the Transuranic Waste Technology program are to develop technology for management of buried TRU waste and to reduce generations of future waste. During FY 1989, the program will: continue buried waste immobilization studies at arid and humid sites; continue research and development activities for reducing the generation of transuranic waste in the future; initiate development of equipment for in-situ assay of buried waste and contaminated soil; and develop technology for safely exhuming buried waste and contaminated soil.

Low-Level Waste Technology

The Low-Level Waste Technology program supports DOE waste operations for the disposal of low-level solid wastes. This program will assist disposal operations in meeting the DOE orders by increasing assurance and developing guidance for a systematic low-level waste management program. The objectives of this generic applied technology program are to: improve techniques for disposal by shallow-land burial; provide supporting documentation in assuring compliance with DOE criteria for disposal; develop cost-effective treatment processes to stabilize certain low-level waste streams; reduce volumes by generation avoidance; and evaluate disposal concepts such as greater confinement for application at DOE sites.

FY 1989 activities will include providing accelerated leach test methodology for low-level waste forms; assisting in application of waste management system assessment methodology; providing criteria for radionuclide quantification; and environmental monitoring for disposal sites.

WIPP Research and Development

The mission of WIPP is to provide a research and development facility to demonstrate the safe disposal of defense waste. To implement this, the research and development program includes: site characterizations and evaluations; impacts of heat from radioactive wastes on the salt formation; plugging and sealing waste storage areas; performance of waste packages emplaced in salt; and evaluation of compliance with 40 CFR 191. The FY 1989 program will consist of completing the hydrologic model documentation, completing brine migration studies; initiating gas generation studies; evaluating seal design; geomechanical monitoring of the first storage panel during waste emplacement; and continuing performance assessment studies, including intrusion scenario development.

Hazardous Waste Research and Development

In FY 1989, the Hazardous Waste Research and Development program will develop field demonstration programs for treatment of reactive metals, cleanup and reclamation of waste acids, reduction in waste generation, and monitoring and detection of hazardous organic wastes using in-situ techniques.

HAZARDOUS WASTE COMPLIANCE TECHNOLOGY PROGRAM

(Chart 30) The Hazardous Waste Compliance Technology Program is requesting $9.8 million in FY 1989. This program provides support to Defense Programs (DP) in meeting operational Resource Conservation and Recovery Act (RCRA) requirements in the treatment, storage and disposal of hazardous and mixed hazardous and radioactive wastes. A significant part of the effort is

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
HAZARDOUS WASTE COMPLIANCE TECHNOLOGY
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
COMPLIANCE TECHNOLOGY	$ 3.3	$ 1.6	$ 3.5
INFORMATION SYSTEMS	2.4	1.2	1.3
DEMONSTRATIONS	1.9	4.3	3.6
CAPITAL EQUIPMENT	0.2	1.8	1.4
GPP	0	0.1	0
TOTAL	$ 7.8	$ 9.0	$ 9.8

- o DEMONSTRATE COST-EFFECTIVE HAZARDOUS WASTE AND MIXED WASTE TREATMENT, STORAGE AND DISPOSAL TECHNOLOGIES TO ASSIST DP ACTIVITIES IN COMPLYING WITH RCRA REQUIREMENTS
- o BEGIN OPERATION OF DP-WIDE HAZARDOUS AND MIXED WASTE REDUCTION PROGRAM
- o CONDUCT TECHNICAL ASSISTANCE AND TECHNOLOGY TRANSFER ACTIVITIES, INCLUDING OPERATION OF THE WASTE INFORMATION NETWORK TO SUPPORT DP HAZARDOUS AND MIXED WASTE COMPLIANCE ACTIVITIES

CHART 30

technology transfer, for which the program manages a computer based system called the Waste Information Network. This system incorporates hazardous and mixed waste data bases, data analysis and reports relevant to DP facility RCRA compliance needs, and it contains access and communication capabilities between and among the waste management sites to assist them in meeting the terms of compliance agreements and consent orders.

In FY 1989, demonstration of cost-effective technologies for hazardous and mixed waste compliance will continue at DP sites. These demonstrations are designed for application to specific DP waste streams to reduce the volume of hazardous waste requiring disposal and to detoxify the waste or reduce the potential for migration to the environment, as required by RCRA.

In addition, technical support to DP sites is provided to help assure compliance with hazardous waste requirements. In FY 1989, the program's waste reduction activities will be in operation, including hazardous and mixed waste training, process and waste generation technology development, and technology transfer. Additional technology support to sites for hazardous and mixed waste compliance as a result of the Department of Energy byproduct rulemaking will also be provided.

Through the Hazardous Waste Compliance Technology Program, a coordinated effort to help assure compliance of DP production, processing and waste management facilities is provided.

TRANSPORTATION MANAGEMENT

(Chart 31) The Transportation Management Program request of $10.2 million is needed to ensure the continued safe, secure, and efficient movement of radioactive hazardous, and other materials and property to meet Department-wide needs. This includes the development and engineering of packaging certifiable by DOE and/or the Nuclear Regulatory Commission; the investigation of concepts and technologies for future packaging and transportation systems; the maintenance and advancement of capabilities to carry out such investigations; the establishment, implementation, and enforcement of operational policies and procedures relating to the transportation of the Department's property and materials; and informational activities to explain the DOE's transportation program and to address institutional issues and concerns. A corollary mission includes support for the Office of Civilian Radioactive Waste Management in related areas covered by the Nuclear Waste Policy Act. The program provides transportation and traffic management support to all DOE nonclassified programs. It assures that shipment of materials, and especially radioactive materials, is made in full compliance with Federal, State, local, and international transportation regulations.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION
FY 1989 CONGRESSIONAL BUDGET REQUEST
TRANSPORTATION MANAGEMENT
($ IN MILLIONS)

	FY 1987 ACTUAL	FY 1988 APPROP.	FY 1989 REQUEST
OPERATING EXPENSES	$ 8.5	$ 8.4	$ 9.7
CAPITAL EQUIPMENT	0.5	0.5	0.5
	$ 9.0	$ 8.9	$ 10.2

- DEVELOP AND TEST PACKAGES FOR RADIOACTIVE AND HAZARDOUS MATERIALS
  - STANDARDS, MATERIALS, ANALYTIC TECHNOLOGY
  - MODELING TECHNIQUES, SYSTEM EVALUATIONS, AND TESTS
  - SAFETY AND RISK ASSESSMENTS, TRANSPORTATION NETWORKS, LOGISTICS, AND ECONOMICS

- PROVIDE CENTRALIZED EXPERTISE AND MANAGEMENT OF DOE-WIDE TRANSPORTATION AND PACKAGING ACTIVITIES
  - TRANSPORTATION/PACKAGING OPERATIONS
  - TRAINING
  - INFORMATION PRODUCTS
  - DATA SYSTEMS
  - SATELLITE TRACKING SYSTEM (TRANSCOM)

CHART 31

REPOSITORY FEE

(Chart 32) In April 1985, the President supported DOE's recommendation to use the repositories to be constructed under the Nuclear Waste Policy Act of 1982, Public Law 97-425, for disposal of defense high-level waste. The Department is proceeding with arrangements to dispose of defense waste in the same repository to be used for civilian waste. On August 20, 1987, a final Federal Register Notice was published that established the method of calculating the appropriate fee to be paid by DOE into the Nuclear Waste Fund. No funding for the DOE repository fee has been paid into the fund to date, and none is included in the FY 1989 request. A Memorandum of Understanding between Defense Programs and the Office of Civilian Radioactive Waste Management is being prepared to determine the fee payment schedule.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION FY 1989 CONGRESSIONAL BUDGET REQUEST REPOSITORY FEE FOR DISPOSAL OF DEFENSE HIGH-LEVEL WASTE

- THE PRESIDENTIAL DECISION WAS ANNOUNCED IN APRIL 1985 ON USE OF A CIVILIAN WASTE REPOSITORY FOR DISPOSAL OF DEFENSE HLW
- FEDERAL REGISTER NOTICE PUBLISHED 8/20/87 ON METHOD FOR CALCULATING FEE
- PAYMENT SCHEDULE WILL BE BASED ON AGREEMENT BETWEEN DP AND THE OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
- NO FEE REQUEST INCLUDED IN FY 1989 CONGRESSIONAL BUDGET

CHART 32

SUMMARY

(Chart 33) In summary, the DWER budget does increase significantly. However, the base Interim Waste Operations funding remains level, and there is a slight increase requested for the Hazardous Waste and Remedial Actions program. The major increases in program reflect the transition from interim operations to terminal disposal with the approaching completion of the WIPP and DWPF projects, and the initiation of design of the HWVP at Richland. Finally, we are not requesting funding in FY 1989 for the repository fee.

DEFENSE WASTE AND ENVIRONMENTAL RESTORATION FY 1989 CONGRESSIONAL BUDGET REQUEST

SUMMARY OF FY 1989 REQUEST

- **DWTM BUDGET INCREASES BY 5%**
- **WASTE OPERATIONS REMAINS LEVEL**
- **MAJOR INCREASES REFLECT TRANSITION FROM INTERIM OPERATIONS TO PERMANENT DISPOSAL**
  - **DEFENSE WASTE PROCESSING FACILITY**
  - **WASTE ISOLATION PILOT PLANT**
  - **HANFORD WASTE VITRIFICATION PLANT**
  - **MIXED WASTE RULEMAKING**
- **INCREASE REQUESTED FOR ENVIRONMENTAL RESTORATION (24%)**
- **WASTE FEE IS NOT INCLUDED IN FY 1989 REQUEST**

CHART 33

This completes my presentation. I shall be happy to answer any questions you may have on either the Nuclear Materials Production program or the Defense Waste and Environmental Restoration program.

STATEMENT OF F. CHARLES GILBERT
DEPUTY ASSISTANT SECRETARY FOR DEFENSE PROGRAMS
U.S. DEPARTMENT OF ENERGY

INTRODUCTION

Mr. Chairman and members of the Committee, I am Dr. Charles Gilbert, Acting Deputy Assistant Secretary for Security Affairs (DASSA). It is a pleasure to appear before you today to address the Department of Energy's Security Affairs programs of Nuclear Safeguards and Security (including the Office of Classification), Security Investigations, and Verification and Control Technology, and our Fiscal Year (FY) 1989 budget request required to carry out these programs.

Although I have appeared before this Committee as a representative for other DOE key areas, this will be my first time as the Acting Deputy Assistant Secretary for Security Affairs. Prior to my tenure with DOE and its predecessor agencies, I worked in various capacities at the Lawrence Livermore

Laboratory in California. Until my current assignment as acting DASSA, for the last 6 months I headed up an ad hoc Arms Control Working Group for the Assistant Secretary for Defense Programs. Prior to that I served as Director, Office of Classification; Director, Office of Security and Quality Assessments; and Deputy Assistant Secretary for Nuclear Materials after having been Director of Nuclear Materials Production; and I have also served as Deputy Director of the Office of Military Application.

Mr. Chairman, let me stop and say at this point that I intend to keep you informed on the activities of interest to your Committee in the Security Affairs area. Routinely, I will be communicating our program initiatives and areas of concern to you and the Committee staff. I will be pleased to meet with you, Committee members, or the Committee staff at anytime to discuss matters of interest.

SECURITY AFFAIRS

The Security Affairs programs that I will discuss with you today play an extremely critical role in fulfilling the Department's national security mission. We are keenly aware of the importance of our responsibilities in carrying out these programs. They are the Department's cornerstone in: preventing the theft or sabotage of nuclear weapons, materials, facilities, and compromise of classified information; developing and implementing policy for managing the classification and declassification of information; providing nuclear weapons systems expertise to the Intelligence Community; controlling proposed exports of nuclear materials technology and equipment; providing technology and equipment necessary to monitor treaty compliance of foreign nuclear weapons programs; and providing technical and analytical support for DOE's role in arms control negotiations, policy formulation, and implementation.

First let me mention the Verification and Control Technology (V&CT) program in the Office of International Security Affairs. The V&CT program has the overall goal of supporting the development and execution of U.S. national security and foreign policies in the areas of treaty verification, intelligence, arms control, and control of sensitive technologies as they pertain to the Department of Energy's responsibilities. Important initiatives include the Joint Verification Experiments and the verification of the provisions of the START treaty. A more detailed discussion of the V&CT program and major initiatives will take place later in the testimony, after the Nuclear Safeguards and Security section.

Although I have only been associated with the Security Affairs programs such as Nuclear Safeguards and Security, etc. for a short period of time, I have been impressed with the Office of Safeguards and Security's corporate commitment to an effective safeguards and security environment, which is demonstrated by DOE officials and DOE contractors. There continues to be outstanding support and commitment by our protective force, major nuclear facilities, as well as our research and development contractors.

FY 1989 BUDGET

Security Affairs requests $259.8 million for FY 1989, a net increase of 13 percent over FY 1988. This consists of $80.2 million for Nuclear Safeguards and Security (including $4.6 million for Classification); $40.0 million for Security Investigations; and $139.6 million for Verification and Control Technology.

NUCLEAR SAFEGUARDS AND SECURITY

The Nuclear Safeguards and Security program has three major program goals:

- Prevent the theft, sabotage, or loss of nuclear weapons and their components, special nuclear materials, and facilities and the unauthorized disclosure of classified information.
- Provide a base of safeguards and security technology for the protection of Department of Energy facilities, nuclear weapons, materials, and classified information.
- Support international protection to deter the diversion of nuclear materials and to support nonproliferation and national security objectives.

INITIATIVES

I would like to briefly discuss the status of several initiatives the Department has undertaken to enhance our overall security posture, and which are in furtherance of these goals.

In our policy role, with the support of a Department-wide safeguards and security task force, we have been successful in updating almost all safeguards and security Departmental directives, including the incorporation of the Department's Inspection Standards and Criteria. It is expected that all revised directives will be published in March/April 1988. This effort strengthens our overall policy role, and helps to ensure consistency of implementation throughout our facilities.

Corporate Planning and Programming

Effective safeguards and security planning is a cornerstone in the development of cost effective and appropriate protection measures for the Department's assets. OSS has developed a corporate safeguards and security planning approach that considers long-term programmatic requirements and trends, identifies strategic policy issues affecting the outyears, and identifies action that must be taken to address concerns and vulnerabilities. During the last year, a Five-Year Plan was developed providing a forward look at major policy initiatives under development and the focus of future policy direction. It is from baseline planning direction such as the Five-Year Plan that field offices may better develop their individual safeguards and security planning documents and resulting budget needs. The development of forward-looking plans both at Headquarters and at our operations offices will help assure that we are planning in a cost-effective manner.

The Master Safeguards and Security Agreements (MSSA's) are among the most important initiatives in our planning approach. They document a binding agreement regarding the acceptable levels of protection for critical facilities and strike a balance between inherent risk and incremental costs associated with additional protection measures for the Department's major facilities. They are "living documents" that support a graded approach to safeguards and security planning and programming throughout the Department.

In addition to the Five-Year Plan and MSSA's, a comprehensive review is being undertaken to ascertain which levels of standardization may be possible for safeguards and security equipment and the best methods to implement the procurement of standardized equipment having specifications based upon performance requirements. The results of these studies may serve to reduce or better manage inventory levels, simplify training of security inspectors, enhance safety, and reduce equipment costs through a common procurement procedure. This initiative is another critical component in our "proactive approach" towards planning and establishing the Department's safeguards and security crosscut estimates.

It is believed that these initiatives are representative of a corporate planning approach designed at assuring that our resources are applied based on the consequences of loss and associated risks to the public health and safety and national security. In addition, the planning approach will help assure appropriate Departmental coordination, consistency, and the development of forward-looking plans in the area of safeguards and security.

Central Training Academy

As discussed before this Committee last year, the Department has continued to focus direct management support on top quality training for its contractor protective force personnel at the Central Training Academy (CTA) in Albuquerque, NM. During the past year, the CTA has taught courses in hostage negotiations, supervisory qualification, firearms safety, tactical response, arrest authority, and use of force. In addition, the CTA's expertise is being applied to other safeguards and security areas of concern. For example, the CTA has examined standardization and safety aspects of firearms throughout DOE facilities. In addition, another assessment is underway at the CTA to evaluate and recommend options for DOE's procurement and use of hardened vehicles. Responding to a specific need to answer the elusive question, "How much is enough?," the CTA has been providing tactical vulnerability analysis training programs designed to enhance onsite protection planning for safeguards and security improvements. The CTA has proven to be an extremely valuable asset to the Department in its short period of existence. Because of the top notch quality of its faculty, CTA advice and methods are much sought after by other Federal agencies as well as state and local law enforcement organizations.

Guidelines for "Hot Pursuit"

Section 161.k. of the Atomic Energy Act (42 USC § 2201(k)) was recently amended (Defense Authorization Act of 1987 - PL99-661) at the Department's urging to ensure our contractor protective force personnel had sufficient legal authority to pursue "fleeing felons" beyond the boundaries of sensitive DOE facilities. Draft procedural guidelines have been developed, and are currently under review, which would ensure that all sites implement their "fresh pursuit" instructions in a consistent manner. These guidelines are expected to be finalized within the next few months.

Physical Fitness for Security Inspectors

I am pleased to report that the Department's continuing physical fitness program for our protective force personnel remains a successful one. These locally developed and administered training programs better ensure that our protective force personnel have the ability to successfully sustain the physical stress of responding to potential emergency conditions. The relatively new program requirement (as promulgated by 10 CFR Part 1046) is now in its fourth year of implementation.

Nuclear Material Control and Accountability

The Department's initiatives and programs over the past several months have included revisions to the graded safeguards approach to improve efficiency. These revisions have been included in the DOE orders and guides are under development for implementation. Aided by improvements in measurement technology and data analysis techniques, nuclear material control and accounting practices are now being increasingly emphasized at key DOE sites to identify improvements that will help address concerns such as special nuclear material diversion that might be masked by measurement uncertainties or falsification of data. Nuclear materials measurements and related control programs are vital to effective safeguards in meeting the needs of detection and confirmation that no diversion has occurred. The Office of Safeguards and Security is sponsoring efforts at DOE national laboratories and the DOE New Brunswick Laboratory to assure that all potential avenues of material flow across material balance areas within the DOE complex are controlled and accountability maintained.

Visits and Assignments Initiative

We are participating in an effort to improve security for the Department's unclassified visits and assignments program. Each year our laboratories host many visitors and assignees from foreign countries under agreements for cooperation or on a scientist to scientist basis. While these interactions are an integral part of the scientific process, they could result in the inadvertent disclosure of classified or sensitive information if not conducted properly. Because of such concerns, we are developing a revised security policy to improve physical and technology security and security awareness for the visits and assignments program.

Technical Surveillance Countermeasures Program

DOE's technical surveillance countermeasures (TSCM) program is intended to ensure that no opportunity exists for audio or optical data to be surreptitiously extracted from its facilities. During the past year, DOE began revising the TSCM element of the technical security program. Included in this effort has been an extensive rewrite of the procedural documentation used to operate the TSCM program at DOE and DOE contractor sites. The implementation of these documents, along with the issuance of a new TSCM policy order, will result in better management of program resources and make services more efficient and cost effective. This new policy will effectively implement a program of using TSCM resources for preconstruction advice and assistance during construction planning stages to prevent later security modifications and corrections in building construction. This program will eliminate most unnecessary expenditures and manhours used in facility reconfiguration.

In addition to these management and operations enhancements, training for DOE contractors performing TSCM services was identified as an important initiative. A DOE Technical Security Resource Center (TSRC) has been established and will undertake the task of providing up-to-date TSCM training for all contractor technicians and management personnel. Planning is also underway to provide DOE contractors performing TSCM services specialized training at national training centers.

These efforts toward improving policy, procedures, and services are initiatives directed by the Department's management in recognition of national level concerns for the proliferation of technical collection systems directed against sensitive facilities. The programmatic changes will make significant improvements in the overall technical security posture at the Department's facilities.

Classified Document Control Initiative

As a result of a special initiative during 1987 which indicated that classified document control throughout DOE needs improvement, planning and scoping work has been initiated within the Department to improve security policies, practices, and procedures. Requirements for control of Restricted Data are contained in the Atomic Energy Act of 1954, as amended, and Executive Order 12356 contains requirements for control of National Security Information. Implementing procedures are set forth in DOE orders. To this end, a major initiative has been the review and revision of Departmental orders regarding the handling and protection afforded DOE classified information.

Even with the revised policy and procedures, many other areas and concepts need to be further explored and evaluated. Such administrative areas as improved reproduction restrictions and controls and mandatory document destruction (inventory reduction) will be reviewed and policies developed to ensure the propagation and retention of documents is kept to an absolute minimum.

Perhaps the most aggressive and visible area of improvement will be concentrated on the education and training aspects of document control. Several standardized courses of instruction have been proposed and outlined which, when approved, are intended to impact consistent and standardized classified information control concepts throughout the DOE complex.

In addition, our responsibilities for protection of Restricted Data and Formerly Restricted Data exchanged with our allies in the NATO community have become increasingly important. As mandated by the Atomic Energy Act of 1954, as amended, and Executive Order 10841, DOE, together with the Department of Defense, will continue to emphasize protection applied by reviews of the NATO community.

Classified Computer Security Program

Our classified computer security program is directed toward assuring the necessary level of computer and information security while maintaining maximum productive output. In part, this is a greater definition of management responsibilities.

Management involvement is being accomplished by the establishment of a formal planning process for the classified computer security program. This provides a means for identifying resource requirements such as personnel and dollars and for the orderly implementation of new technologies. It also provides for coordinating computer security with other security activities in DOE.

The classified computer security program has defined and adopted a method to assist in the determination of the level of protection necessary for classified computer systems operating in a variety of environments. This method encourages the use of the latest advances in computer technology to provide the necessary levels of protection. A major initiative is the application of this method to all classified computer systems.

A significant activity of the classified computer security program in the DOE has been, and continues to be, the Center of Excellence for Computer Security located in the Los Alamos National Laboratory. The Center provides support for the education and training of managers, computer security personnel, and information users. It also provides field support and conducts research and development in a variety of elements related to computer security.

The classified computer security program has also been closely involved with the DOE weapons design, manufacturing, and testing program in the development, testing, and implementation of a large network to support the Nuclear Weapons Complex.

The rapid growth of computer networks has become a significant challenge to the available technology in computer security. The classified computer security program in the Department of Energy will continue to investigate new and innovative techniques to assure that adequate protection is provided to the vast amounts of information that can be stored and exchanged by these networks of computers.

Personnel Security Program

In 1986 we began a major initiative within the DOE to reduce the numbers and levels of clearances. This effort was continued through 1987 and will continue throughout 1988. Major reductions of the number of active clearances have taken place at some DOE offices; for example, DOE Headquarters reduced the number of clearances by one-third to a current level of about 13,000, and the Oak Ridge Operations Office reduced the number of active clearances by over 11,000 during 1987. We believe that continued emphasis on this initiative will serve to save resources and dollars dedicated to the Department's clearance activities. In 1987 we reviewed and revised the major personnel security program policy and procedural document, which should be issued for implementation in February or March 1988. The program policy is also undergoing further internal review by a special task force created by the Under Secretary as well as the Office of Security Evaluations which reports directly to the Assistant Secretary for Defense Programs. We look forward to the results of these reviews as they may provide recommendations that will assist in enhancing the program objective while reducing the amount of effort dedicated to the processing of clearance requests.

In 1987, all DOE offices submitted plans for approval to the Assistant Secretary for Defense Programs that reflected the manner in which each office would fully implement the requirements for conducting reinvestigations of all cleared persons. Based on these plans, we hope to have completed reinvestigations on all cleared persons by the end of FY 1992. Of course, successful completion of this effort relies on obtaining adequate staffing and program funding for this activity. The effort was initiated after the GAO reviewed the DOE personnel security program and recommended to the Secretary of Energy that such plans be generated and approved for implementation.

Human Reliability Program

The Department has an ongoing effort to design a Human Reliability Program (HRP) that would assure that employees in certain identified positions continue to display sound judgment. This program addresses and reduces the potential insider threat through periodic monitoring of both DOE and contractor employee reliability, and referral of potential problems to the occupational medicine and, through it, the employee assistance programs for possible rehabilitation. An HRP Task Force was created to address and develop agency regulations, directives, and implementation guidelines which were staffed with Headquarters, field office, laboratory, and operating contractor personnel with expertise in a broad variety of human quality assurance disciplines. A Center for Human Reliability Studies (CHRS) was established to assist in providing specialized expertise in various fields related to the HRP development and implementation.

Classification Management Initiatives

In support of the goal to maintain credible, up-to-date, and operationally practical classification policies and guidance, the Office of Classification's FY 1987 support activities focused on continuing active support for technical studies and analyses in such areas as inertial confinement fusion, computer codes, nuclear weapons testing, uranium enrichment, and safeguards and security. In addition, major program efforts continued for the review of sensitive nonnuclear technologies, including Strategic Defense Initiatives (SDI). Substantial progress was made in the development of classification education materials, appraisal training, and quality assurance procedures. A major new program effort was initiated to develop policy and guidance for the identification and protection of Unclassified Controlled Nuclear Information (UCNI) and other categories of unclassified controlled information. Substantial progress was made in international classification coordination efforts with the final development and implementation of the NATO ATOMAL Guide and Classification Management program.

THE BUDGET

The Nuclear Safeguards and Security Headquarters oversight program's budget request for FY 1989 is $80.2 million. Operating expenses require $75.4 million, and capital equipment $4.8 million.

The safeguards and security Headquarters program strategy directly supports oversight and technology development activities in support of domestic and international safeguards and security responsibilities. Oversight activities include: technical assistance to address vulnerabilities identified by onsite evaluations, protective force training, and nuclear materials control and accounting. Also the Office of Safeguards and Security oversees the Federal New Brunswick Laboratory. Technology development activities include a unique, nationally available technology base for physical protection, materials control, and nuclear materials accounting systems. This safeguards and security technology base is centered at the national laboratories for application by the Department's field operations and is shared with other

Federal agencies and other countries who are partners in the promotion and application of improved safeguards and security strategies.

This safeguards and security request does not fund the construction, capital equipment, and operating expenses of safeguards and security systems at DOE field facilities. These costs are budgeted for and expended by the Department's outlay programs, which include the nuclear weapons, nuclear materials production, and the civilian nuclear energy and energy research programs.

Mr. Chairman, the FY 1989 request of $80.2 million consists of the following five basic elements which I will address. These include: safeguards and security operations, technology development, international safeguards, classification, and program direction.

SAFEGUARDS AND SECURITY OPERATIONS

This category supports the Headquarters oversight mission of protecting Departmental resources, which range from completed nuclear weapons to classified documents. At the heart of the oversight program is a uniform systematic approach to safeguards and security programs which can assure that proposed solutions are both effective and efficient.

Elements in this category involve three major functions: guidance and assistance to DOE field operations for safeguards and security system improvements; oversight of the Nuclear Materials Management and Safeguards System, which provides timely data on nuclear materials production, utilization, transfer, tracking, and storage; and the operation of the New Brunswick Laboratory, the safeguards analytical standards and field assessment operations laboratory at Argonne, Illinois.

Over the past few years, at no small expense, we have corrected deficiencies at DOE facilities. Field managers have applied state-of-the-art, large-scale hardening features and surveillance equipment; and have dramatically improved guard force response capabilities. I believe the Department has made DOE sites unattractive targets to any adversarial force.

We are now seeking to balance the protection systems in place against terrorist threat with an effective program against the full spectrum of threat, including protection against potential perpetrators who may actually have access to DOE facilities. Potential perpetrators include disgruntled employees, visitors, and assignees, and we must have programs to deal with them. We are pursuing several major management initiatives that comprise an integrated protection program against insiders. Key elements include: personnel clearance, human reliability, physical protection, information and document control, operations security, security education and awareness, intelligence community liaison, foreign travel/alien visits and assignments, and nuclear material control.

I have already touched upon initiatives in personnel clearance, human reliability, elements of physical protection, and document control. In recognition of the hostile intelligence threat to classified or sensitive unclassified DOE technologies or facilities, we will continue to maintain a strong operations security, or OPSEC, program. OPSEC is a key ingredient in our overall security protection program and is fully integrated both at Headquarters and all field elements. The Office of Safeguards and Security (OSS) has provided sufficient training for field personnel to conduct their own OPSEC vulnerability assessments and this process is well underway. Identified vulnerabilities are analyzed, countermeasures are developed, and their implementation is prioritized all at the local level. The OSS ensures the effectiveness of this program through an oversight management process.

We will also continue to operate our Security Education and Awareness program. This program was substantially improved in FY 1987 through revised policy establishing new requirements to strengthen the DOE program and implement new national policy. FY 1988-89 activities will include analyses in such areas as the human reliability program, foreign travel and visits and assignments activities, and insider and outsider threats, to determine appropriate changes which may be required in Security Education. We will continue conducting workshops and seminars, and providing educational materials throughout the DOE.

The Department has implemented NACSI 5004 in the TEMPEST program and will continue to control compromising electromagnetic emanations through a variety of countermeasures, including the use of zone tests. We will also continue the development of advanced technical surveillance countermeasures and suppression technology in support of the Intelligence Community technical security operations.

Central Training Academy

Advanced special weapons and tactics training, with a particular focus on realistic tactical situations, continues to be a critical ingredient in improving the capabilities of our protective forces. We are using our Central Training Academy (CTA) to provide uniform training standards and to improve supervisory effectiveness throughout DOE. The CTA instills a uniform and professional approach to protective force training in the tactical, operational, and technical aspects of physical security. The curriculum at the CTA will be expanded in depth and scope to certify instructors and training officers, to train tactical vulnerability assessment officers, and a variety of other safeguards and security discipline subjects and functions not being taught outside the Department of Defense. In 1987 the CTA provided training for 2,400 students onsite and offsite and offered 17 courses. In FY 1988, the CTA will provide training for 3,900 students and offer 31 courses. In FY 1989, it is projected that 5,400 students will be trained and approximately 37 courses will be offered.

Nuclear Material Management and Safeguards System

We will continue to operate the Nuclear Materials Management and Safeguards System (NMMSS), the nation's single nuclear material data base, in cooperation with the Nuclear Regulatory Commission (NRC). The tracking of nuclear material shipments involving DOE contractors, NRC licensees, and foreign trading partners is of paramount importance to DOE and an integral part of the Office of Safeguards and Security mission. NMMSS is charged with the responsibility of maintaining necessary information needed by facilities in order to verify the shipment and receipt of nuclear materials while reconciling nuclear material inventories held at DOE contractors. Each year, approximately 78,000 nuclear material transactions (e.g., approximately $10 billion in nuclear shipments, receipts, and inventory changes) from 130 contractors and about 900 licensees are entered into this system and tracked.

The purpose of maintaining the nuclear material data base is to ensure the safeguarding of material movements within the United States and abroad and the U.S. compliance with international treaties and public law.

New Brunswick Laboratory

The New Brunswick Laboratory (NBL) is our Center of Excellence in nuclear measurement technology and serves as the technical extension of the Office of Safeguards and Security in the areas of measurement science and material accounting. The NBL serves as the U.S. Government standards laboratory for nuclear materials measurements. Its functions include: maintaining and improving an internationally compatible reference base for nuclear material measurements; assessing and evaluating measurement technology in support of the DOE nuclear fuel cycle and weapons production activities; developing, certifying, and distributing reference materials for calibration and standardization of nuclear material measurements; and assisting in technology exchange and training in safeguards measurement technology.

Master Safeguards and Security Agreements

As I discussed earlier in this testimony, Master Safeguards and Security Agreements (MSSA's) are one of our most important initiatives. Continued high-level emphasis was placed on our MSSA program during the last year, resulting in the development of a draft MSSA order and guide, several MSSA's were completed, and more than 25 are in the planning and development stages. A draft safeguards and security planning order and guide has been developed which incorporates the MSSA's, Facility Operational Plan, and Resource Plan for each facility into a cohesive facility planning and documentation process, to be known as the Safeguards and Security Site Plan's (SSSP's). This planning approach incorporates the basic elements of strategic, operational, and resource planning, and will help ensure a "graded approach" with consistent interpretation of risk of the Department's safeguards and security interests. It will also provide the flexibility to accommodate widely varying operations office situations and conditions, and eliminate duplication in reporting requirements.

In support of the MSSA process, the standardization of vulnerability assessments within the Department has led to the development and use of sophisticated, user-oriented, computer models. These models are critical for assessing the effectiveness of our facility protection programs and completing facility MSSA's. Continued refinement and improvement in the models will be made throughout the next 5 years, to include the development of a single integrated vulnerability assessment code by the end of FY 1990.

TECHNOLOGY DEVELOPMENT

Technology development continues to be an integral part of our safeguards and security program since advanced technology is necessary for improving control and accountability of nuclear materials, physical security, classified information control, and protection of government property. Technology development activities conducted at the national laboratories provides DOE with a technological base for developing new systems or applying existing technology to safeguarding the Department's nuclear facilities and materials. Results of these efforts are also made available to the other Government agencies.

Where appropriate, joint research efforts of mutual benefit to each agency, are identified. We will continue to emphasize close interagency coordination to minimize cost. Even though our research and development activities are coordinated with other agencies, fiscal constraints will continue to encourage us to urge other Government agencies benefiting from the technology base to increase their share of funding.

An integral element of the technology development planning, programming, and budgeting process is assessment of near-term and future risks, with the aim of investing in a development strategy that keeps risks at an acceptably low level. Such an assessment must take into account the spectrum of threats (i.e., the full range of characteristics and resources as opposed to separate focus on the "outsider" and the "insider"), including the trends and directions of change in the threats. DOE has taken steps to improve the leverage of technology development for enhanced capability to mitigate the threat to DOE facilities. These steps encourage preplanned and affordable improvements. In addition to solving a problem and enhancing safeguards and security capabilities, evaluation criteria require a proposed technology development project to offer potential reductions in operational outlay ("crosscut") estimates for safeguards and security. This provides an incentive and leverage to improve both effectiveness and efficiency of the overall safeguards and security mission, and requires close coordination with outlay programs and designs to influence and provide timely cost effective performance criteria for new DOE facilities and processes.

As for the classified computer security program, it will continue to implement national policy in computer and information security and has initiated a management review process to provide oversight of the implementation of DOE policy. This program also supports the Center of Excellence for Computer Security located at the Los Alamos National Laboratory. The classified computer security program will continue to develop new and innovative techniques to assure that adequate protection is provided to the information stored or transferred by Department of Energy computers and computer networks.

INTERNATIONAL SAFEGUARDS

Our international safeguards program supports U.S. nonproliferation and national security objectives to minimize the proliferation of nuclear weapons. The activities of program staff and contractors are required by the Atomic Energy Act of 1954, the Nuclear Non-Proliferation Act of 1978, the Omnibus Diplomatic Security and Anti-Terrorism Act of 1986 and implementing Executive Orders and Presidential directives. The primary objective is to strengthen international safeguards and physical protection through technical support to the International Atomic Energy Agency (IAEA) and cooperative efforts with other nations. Research and development will continue on new and improved technologies and systems for IAEA safeguards, including efforts on safeguards for reprocessing plants and for mixed-oxide (plutonium and uranium) fuel fabrication plants. These efforts reflect the increasing use of plutonium as fuel in civil nuclear fuel cycles. An important aspect of our research and development is increased bilateral cooperation, including technical exchanges with the Federal Republic of Germany, France, the United Kingdom, and Japan, as well as the inspectorate of the European community. These bilateral efforts optimize the research and development efforts of the U.S. and other nations through exchanges of information, staff, and equipment on international safeguards and physical protection of nuclear materials. Additionally, the application of the atomic vapor laser isotope uranium separation (AVLIS) process for enrichment will introduce a new requirement for development of international safeguards methods and equipment for use with AVLIS under the U.S./IAEA agreement for the application of international safeguards in the U.S.

Beginning in FY 1988, we will expand international safeguards cooperation with Japan. This increase in cooperation will also help the DOE develop the most advanced safeguards technology for a new plutonium fuel fabrication facility and other Japanese facilities to meet IAEA safeguards requirements. Development costs will be borne by Japan but the technology developed could have wide application where other countries are also expanding uranium/plutionium processing facilities such as the FRG, U.K. and France.

Compliance with international agreements and nonproliferation objectives requires that we monitor certain international shipments of U.S.-origin materials and tracking of foreign origin materials in the U.S. Other continuing activities include recording exports, imports, and transfers of materials of foreign origin in the U.S.; reporting to the IAEA under the U.S./IAEA Safeguards Agreement and other agreements; and determining inventories of nuclear materials for bilateral agreements for cooperation.

PROGRAM DIRECTION

Our program direction supports a total of 148 Headquarters full-time equivalent positions, which includes the staff for the classification program.

CLASSIFICATION

The FY 1989 request for the Classification program, which is incorporated in the Nuclear Safeguards and Security program budget, is $4.6 million. The FY 1989 Classification program will continue at the FY 1988 level of effort. The Office of Classification manages and implements the Department's program for the classification, declassification, and control of information in the interest of the national security.

The FY 1989 request will continue active support for the review of potentially sensitive DOE research and development activities, as directed by National Security Decision Directive-189 (NSDD-189) and for classification development and oversight activities in program areas involving sensitive technologies including Strategic Defense Initiatives, nuclear testing, and other nuclear weapons areas. In addition, international coordination efforts will continue with the implementation and monitoring of NATO ATOMAL classification management functions. Efforts will continue on the development of policy and guidance for the identification and protection of Unclassified Controlled Nuclear Information and other categories of unclassified controlled information, as well as concentrating efforts on development of guidance in such priority areas as computer codes, isotope separation, and safeguards and security. Support will be provided for enhancement of classification education and training efforts. Efforts will continue on improving the effectiveness and efficiency of the classification and control program through enhanced automation activities. Continuing support will be provided for the Office of Classification's appraisal, quality assurance, and document review programs.

SECURITY INVESTIGATIONS

The FY 1989 request for personnel security investigations is $40.0 million. Background investigations are required by the Atomic Energy Act of 1954, as amended, and by Executive Orders 10450 and 10865. The Department is not permitted to conduct its own investigations; hence, we rely on and reimburse the Federal Bureau of Investigation (FBI) and the Office of Personnel Management (OPM) for conducting investigations of DOE employees, contractor employees, and consultants assigned to critical sensitive positions prior to their being granted access to classified information, classified materials, or special nuclear materials.

In order to have efficient program management and be consistent in meeting security requirements, we use this single program to meet the strict requirements of the Atomic Energy Act of 1954 to ensure that granting access to classified information, classified material, or special nuclear material (SNM) will not endanger the common defense and security. Most background investigations directly support Defense Programs since the Department believes any clearance or access determination is directly related to protecting the common defense and security. The DOE is continuing to review access authorization levels system-wide and lowering many Q-"Sensitive" access authorizations requiring an FBI reinvestigation to Q-"Nonsensitive," requiring an OPM reinvestigation, or even lower levels. Individuals with clearances whose duties do not require them to have access to classified data or SNM are having their clearances terminated.

During the last year, the OPM has not made significant progress in reducing the time required to conduct a background investigation. However, OPM has recently obtained approval from the OMB to hire an additional 180 investigators. With the additional investigators and the close out of their private sector contractor investigator effort, OPM hopes to reduce the investigative times during FY 1988. Unfortunately, OPM has experienced difficulty hiring investigators, so we have not yet realized reduction in investigation time we hope for.

Our FY 1988 budget provides for approximately 29,000 initial full-field investigations and all National Agency Checks with Credit and 22,000 reinvestigations. This reinvestigation total includes almost 11,000 reinvestigations using prior year funds. In FY 1989, the full-field investigations and National Agency Checks will increase to approximately 31,000, and total reinvestigations will be approximately 20,000.

SAFEGUARDS AND SECURITY CROSSCUT

As I mentioned earlier, the DOE outlay programs fund safeguards and security activities at the Department's field facilities. Total safeguards and security funding is approximated in the Department's crosscut estimate, which is a rough summation of all safeguards and security items in the Department's program requests, including the budget for the Office of Safeguards and Security. The crosscut estimate for FY 1989 totals $868 million, with $735 million as the defense activities portion.

As the Departmental coordinator for all DOE safeguards and security activities, Security Affairs has a range of responsibilities for safeguards and security crosscutting activities which include ensuring that program budget submissions properly reflect judgments that have been made with respect to security considerations. For example, the major construction upgrades at critical nuclear weapon facilities, such as Savannah River, Pantex, and Oak Ridge, which provide enhanced integrated protection programs against the Department's defined threats, were fully coordinated with and supported by

Security Affairs. We validate the need for safeguards and security improvements, evaluate proposed upgrade designs for adequacy, and verify the performance of the upgrades once they are in place. This process is critical if we are to assure continued protection system progress in upgrading our critical facilities, and effective safeguards and security integration. Significant progress has and continues to be made towards increasing the level of protection of our facilities and the protection of DOE assets. A good portion of this has been accomplished through guard-intensive, quick-fix measures. The validation of major construction projects designed to provide long-term permanent corrective action to vulnerabilities is critical to assuring effective safeguards and security integration and the replacement of existing systems with more state-of-the-art hardware and software protective measures. When this is accomplished, our safeguards and security program will be well along towards achieving our objectives.

I would now like to discuss the FY 1989 budget request for Verification and Control Technology.

VERIFICATION AND CONTROL TECHNOLOGY

In the following sections, I will describe the program elements within the V&CT program and give you a view as to how these elements fit into the overall program.

The overall goal of the V&CT program is to support the development and execution of U.S. national security and foreign policies in the areas of treaty verification, intelligence, arms control, and control of sensitive technologies as they pertain to the Department of Energy's (DOE) responsibilities. Specifically, the program:

- Conducts advanced research, development, and fabrication of detection, identification, and characterization systems to support nuclear related treaty verification requirements;

- provides technical and analytical support for DOE's role in nuclear arms control negotiations and related interagency deliberations;

- reviews the export of technology, materials, and equipment related to DOE areas of responsibility;

- provides for foreign intelligence support to the Department on the entire range of its responsibilities; and

- manages and facilitates the transfer of defense-related technology developed by DOE and its contractors to the U.S. private sector, ensuring consistency with U.S. national security and non-proliferation policies and objectives.

The V&CT activities are managed under the Deputy Assistant Secretary for Security Affairs and the Deputy Assistant Secretary for Intelligence (DASI), and are carried out by DOE Headquarters staff, the national laboratories, and DOE contractors. The program efforts are carefully coordinated in the interagency arena with the Departments of Defense (DOD), State (DOS), and Commerce (DOC), the Arms Control and Disarmament Agency, Defense Advanced Research Projects Agency, the Intelligence Community, and the Nuclear Regulatory Commission (NRC).

V&CT activities can be divided into three broad categories: (1) detection/verification technology research and development; (2) analytical support; and (3) threat assessment.

The detection technology programmatic objective encompasses the research and development (R&D) of technologies, the required production or fabrication of systems for verification of current and potential arms control treaties, and for monitoring associated foreign treaty related activities. Detection technology final products contribute substantially to the development of the national technical means for the monitoring and verification of nuclear and advanced concept weapon treaties, both current and potential. Long-term efforts are focused on assuring that technological capabilities for verification meet national needs, maintaining a robust and survivable satellite sensor program, enhancing regional seismic verification capabilities, accelerating directed energy monitoring, pursuing an evolving group of non-seismic verification projects, and maintaining a broad technology base.

Analytical support activities are conducted within the V&CT program.

Arms control analytical support activities are directed toward the development, establishment, and implementation of Administration policies toward treaty negotiations and verification. Studies on arms control approaches and their likely impact on overall arms control goals, together with technical support, are provided at interagency and international arms control policy and treaty verification/compliance deliberations. These constitute a significant portion of the DOE presence in arms control actions.

Within the V&CT, detection technology analytical support activities are closely coordinated to ensure that the policy guidance developed in the interagency arena is used to direct the development of treaty verification technologies. Conversely, the results of verification technology development are used to ensure that treaty negotiations are constrained within technically verifiable limits. This approach allows for effective, efficient, and concurrent treaty policy and technology development.

The programmatic objectives of additional analytical support activities are directed at controlling sensitive technology through the export control review process and implementation of technology transfer/ nonproliferation policies. A number of these responsibilities are fixed by statute (e.g., the Atomic Energy Act and the Nuclear Nonproliferation Act of 1978) and Executive Order 12333. Others are policy responsibilities resting in DOE. Export control and technology transfer concerns derive from national security and nonproliferation-related policy and lead to positions on the export, distribution, and transfer of strategically significant technologies as well as sensitive nuclear technology, nuclear materials and equipment. In addition, DOE develops views on the export of other significant items or substances for nuclear explosive purposes and participates, as appropriate, in related interagency activities in the Executive Branch.

The DOE is tasked by Executive Order 12333 to: provide expert technical, analytical, and research capability to the Intelligence Community; formulate intelligence collection and analysis requirements where the expert capability of DOE can contribute; produce and disseminate foreign intelligence necessary for the Secretary of Energy's responsibilities; and participate with the DOS in overtly collecting information with respect to foreign energy matters. The nature and scope of these intelligence activities will continue to be influenced by a variety of international events and trends, particularly in the areas of nuclear and non-nuclear energy policy and technology, strategic petroleum issues, defense and national security policy, and weapons technology development.

The other primary V&CT program area is in the arena of domestic threat assessment. The Office of Threat Assessment (OTA), under the DASI, consolidates the DOE threat analysis activities within a single office to provide timely assessment of actual or potential threats to Department facilities and activities. These assessments are provided to the Secretary, appropriate Assistant Secretaries, DOE Headquarters program offices, and field elements. This program is responsible for: coordination of information requirements with appropriate federal, state, and local government agencies and organizations; in cooperation with the Office of the General Counsel, development and implementation of pertinent DOE directives, regulations, and procedures governing information collection, storage, and dissemination; development and maintenance of data bases in support of threat assessment activities; and preparation and dissemination of finished analyses.

Detection Technology

This V&CT program element performs basic research, develops technologies and analytical tools, and fabricates and supports systems for nuclear-related treaty verification and for Intelligence Community technical intelligence collection support. The resources of the DOE national laboratories are strong participants in these programs, in most circumstances at the forefront of the scientific and technical state-of-the-art. Detection technology projects range from seismic to satellite instrumentation, from Deleted Deleted gamma radiation frequencies, sensors at ranges of centimeters to millions of miles, and immediate read-out to the longer term sophistication of Cray computer processing time.

Programmatically, detection technology projects are structured to support the Limited Test Ban Treaty (LTBT), the Threshold Test Ban Treaty (TTBT), the Peaceful Nuclear Explosives Treaty (PNET), the Intermediate Nuclear Forces Treaty, and other potential treaties such as Strategic Arms Reduction Talks (START).

Verification of the LTBT is accomplished through the development of satellite instrumentation for the detection, identification, location, and characterization of nuclear detonations, in the atmosphere, or in space.

Under this program, we fabricate satellite sensor payloads, satellite-borne sensors which provide monitoring of compliance with the LTBT and also support data collection on potential proliferating nations and on nuclear weapon states that are not LTBT signatories.

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Most of the DOE sensor systems are a part of the Integrated Operational Nuclear Detonation Detection System (IONDS), carried by the satellites of the Global Positioning System and the Defense Support Program (DSP). These DOE-produced sensors provide worldwide surveillance and FY 1989 satellite instrumentation development and fabrication efforts are impacted by the need for the DOE to fulfill its responsibilities

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DOE sensor systems are also carried as piggyback or secondary mission payloads on classified satellites developed and procured by the Air Force Space Division and operated by the Air Force Space Command.

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The on-site monitoring activity develops the capability to monitor compliance with the yield constraints of the TTBT and PNET . The discussions underway with the Soviets concerning improved verification of the TTBT are based on the DOE developed on-site monitoring technology. The V&CT program is charged with providing modern equipment, manpower, expertise, and a full range of capabilities to permit the United States to fulfill its PNET and TTBT verification responsibilities. DOE has developed and evaluated hydrodynamic yield measurement (Continuous Reflectrometry for Radius versus Time Experiment, (CORRTEX)) as a monitoring technique. CORRTEX can be combined with complementary teleseismic system

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In addition to teleseismic measurements, the DOE is working on in-country seismic capability for using seismic verification at regional (short-range) distances. This emphasis is to ensure that DOE can fulfill any national decision to provide equipment and systems to support U.S. verification of any future treaties related to further constraints on underground nuclear tests. An example of technology developed under our program is the regional seismic array approach that is embodied in the Norwegian Regional Seismic Array. The objective is to reduce the error range of yield estimates of nuclear tests Deleted

Deleted by using additional regional arrays. The first five units of the Deployable Seismic Verification System (DSVS) are under construction. Any future treaties that further constrain nuclear testing will depend on such a capability to enhance confidence in Soviet compliance with treaty obligations. These systems may be used in a regional monitoring role for improved yield estimation at lower levels, or for general in-country monitoring. The latter case would require a significantly larger number of units than are now planned.

In addition to its verification efforts for treaties constraining nuclear explosions, the detection technology program develops gaseous and particulate radioactivity monitoring systems for sample/debris detection and analysis. Collection and analysis of fresh radioactive debris provides the only unambiguous evidence of clandestine nuclear activities, an area of increasing concern in the current environment where third-world countries are developing their nuclear capabilities. The result of this effort will be monitoring facilities with high sensitivity, on-site analysis capabilities, and telemetry of real-time data to a central monitoring facility.

Other monitoring activities include R&D of means, other than optical and seismic, for detection of nuclear detonations. Seismic nuclear explosion verification activities are long-standing and appear to be approaching maximum levels of capability for any particular seismic distance. Nonseismic means of detecting nuclear explosions - especially for a possible lower yield threshold - are essentially nonexistent. Because of the vast area of the Soviet Union that is seismically active and the potential for treaty evasion that such seismic activity offers, other technical means of monitoring nuclear explosions require investigation. These means would complement existing or developmental seismic verification capabilities.

Directed Energy Weapons (DEW), both ground-based and in space, are of increasing interest.

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Therefore, research must be conducted on techniques for monitoring these activities.

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Our program supports documented requirements for characterization of all DEW systems. As a natural outgrowth of these characterizations and our laboratories expertise in these disciplines, we are developing sensors, systems, data handling, processing, and analysis capabilities. Ongoing work also concerns a viable satellite attack warning system to enhance the survivability of U.S. satellites to foreign attack.

As the last major element in detection technology, we are managing the basic research and technology development of advanced concepts. In these projects we are exploring concepts and basic technologies which can provide sensors or analytical tools in support of multiple projects within the program. Although prototype systems are also developed, our primary interests here is assuring that technology is available for incorporation into these systems. We have adopted a policy which is still relatively new within the technical intelligence collection R&D community; i.e., the concurrent development of the analytical tools necessary when any collection system is prototyped. This approach allows us to provide "turn-key" systems to the Intelligence Community from the expertise of the DOE national laboratories, thereby avoiding the customary delay when data is collected, but the analytical tools have not been developed.

Analytical Support

The objectives of the arms control program of applied research and policy support are: to continue to support interagency and international policy deliberations and negotiations, to provide programmatic support for improvement of arms control techniques and approaches, and to maintain the capability to supply technical support in the arms control arena. To meet these objectives, our work program is divided into three categories:

(1) studies and analyses of current active issues, (2) studies directed toward future issues, and (3) quick-reaction response to current events. The in-house staff and selected expertise from the national laboratories and contractor support allow us to bring to bear the best expertise in the nation on problems associated with these issues.

Among the most important policy activities is the implementation of the Administration's arms control policies, as communicated in the President's National Security Decision Directives and other sources. Other sources include arms control policy deliberations and U.S./Soviet arms control negotiations and technical discussions.

The DOE's responsibilities in export control and technology transfer follow from statutory requirements and Executive Orders. The DOE is one of a number of agencies involved in the regulation and control of technologies, material facilities, and component exports that relate to the U.S. national material security and nonproliferation interests. In addition to providing operational support to other agencies in the export licensing process, DOE recommendation is required for selected transfers and licensed exports by the NRC, DOC, and Office of Munitions Control. In this connection, DOE must maintain the capability to review and process in a timely fashion more than 10,000 export license applications annually in support of the DOC.

In the area of transfer of sensitive nuclear technology, DOE has developed and implemented revised procedures and orders for processing foreign national visits and assignments, continues to consider new policies and procedures, and will review these requests as well as foreign travel of DOE and DOE contractor personnel to sensitive areas. DOE will also continue to support revision of the Militarily Critical Technologies List, with special emphasis on SDI-related technologies. We will also continue to participate, as required, in the interagency working groups, committees, and panels that address the technical and policy issues associated with technology transfer.

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A major initiative begun during FY 1986 was the OTA, organizationally located under the DASI. OTA consolidates the DOE threat analysis activities within a single office. This program supports the Department by providing timely assessments of actual or potential threats to the Department's facilities and activities (programmatic threat assessment), as well as supporting the total U.S. Government by providing expert technical capability to evaluate threats involving nuclear material and/or facilities (communicated threat credibility assessment). OTA tasks include: coordination of information requirements with appropriate federal, state, and local government agencies and organizations; development and maintenance of data bases in support of threat assessment activities; and preparation and dissemination of finished analyses.

INITIATIVES

The budget request for FY 1989 ($140M) is larger than the FY 1988 V&CT budget ($121M), primarily due to the requirements to support national arms control activities which have recently intensified.

The first definitive activities in Joint Verification Experiments (JVE) will occur in the spring of 1988. DOE must be prepared to conduct a JVE in the U.S.S.R. then, as well as during FY 1989. This requires equipment, procedures, manpower, and substantial training. Administrative policy is already in place for this important undertaking and DOE has the responsibility to supply the technology and the capability to implement this policy.

Improved verification of the TTBT will come about through the use of the hydrodynamic yield measuring system developed by DOE, CORRTEX. This is the linchpin to the technology advanced by the administration for improved TTBT verification. However, there still remain elements of this technology to be more fully examined. For example, experiments are being planned to address reducing further the measurement uncertainty. Procedures are being evolved to guarantee the integrity of the data required.

Acquisition of equipment to support a future fielding of the DSVS will be continued in FY 1989. Additionally, seismic verification efforts will be expanded to improve automated signal processing and development of discrimination capabilities.

The V&CT program continues to make investments in research in order to increase future capabilities in verification technology. In FY 1989, a major initiative will be expanded to provide the United States with systems to improve our capability to verify the provisions of a START treaty. Significant support will be required to determine the feasibility of new concepts for longer range detection of treaty prohibited nuclear weapons. In FY 1989, research efforts will be structured to look toward future technological issues of detection, identification, and measurement of directed energy. In the future, there almost certainly will be a need to understand these problems and their resolution as DEW technology evolves and matures.

The BSTS is the early warning satellite sys[illegible] the nation will deploy to replace the present DSP system. In order to maintain the competence of the Atomic Energy Detection System, DOE will outfit each of the BSTS satellites with nuclear explosion detection instrumentation similar to that used on the DSP satellites. This program began in FY 1988 and will expand significantly in FY 1989 to meet the required launch schedule for the first prototype system.

Senator EXON. Mr. Wade, thank you very much. We appreciate your being concise in your presentation, which was a good one.

I am pleased at this time to recognize Senator Wirth, as per the agreement that we made earlier, since he has to get over and preside in the Senate in the near future. Senator Wirth.

MODERNIZATION STUDY

Senator WIRTH. Thank you very much, Mr. Chairman. Mr. Wade, thank you for your thoughtful and careful stewardship of the job that you have. I really appreciate the difficulty of that. I think you have really done a first-rate job.

As you mentioned in your testimony, DOE is in the process of developing a modernization plan for the nuclear weapons complex which is called the 2010 Study. You and Secretary Herrington referred to that study before.

While this is not due to be submitted to the Congress, as pointed out earlier, until December 15, I understand that you are quite a long way toward completion.

Could you tell us what the status of the 2010 Study is and what its recommendations are going to be?

Mr. WADE. I can give you the status, Senator Wirth. It is a fact that as a result of the foresight of my predecessor, Admiral Foley, and also Ray Romatowski in Albuquerque, a great deal of information was already in hand, the 2010 Study being one of those sources.

What we have done is put together a task force that has been in place now for a couple of months. People have been assigned to that task force from several of our field locations and our laboratories, and they are working full time.

Their first order of business, as you would expect, is to catalogue the data that is available. And that will then identify the places where we need more data.

Senator WIRTH. Are you doing a draft study now? Is that right?

Mr. WADE. Not yet, sir. The first report is due to me in May. The May report will simply be a compilation of data in hand and will identify where we need more data.

Senator WIRTH. Well, in one of the existing studies, is there at this time a working consensus within the Department that consolidation of the nuclear weapons production facilities is going to be an essential part of a modernization strategy?

Mr. WADE. Yes, sir. I think we clearly believe that we are too geographically diverse. We need to have fewer locations possibly, and we certainly need to replace some of our facilities.

But I want to be careful not to mislead this subcommittee. The cost of running this complex, as it now exists, is very large. About two-thirds of my budget request, for example, is necessary to keep the doors open.

Senator WIRTH. And no matter what we decided to do, we would still have a big cost?

Mr. WADE. That is right.

Senator WIRTH. Let me go to modernization. The idea of the parks, as I understand it, is that there would be a plutonium park and a tritium park and a uranium park. I mean, that is generally the approach that most people have been talking about. Is that not right?

Mr. WADE. Yes, sir. Those are the concepts.

Senator WIRTH. What does that then mean for some other facilities, like the old plants that exist in Ohio, Fernald, for example and other plants at Hanford or Rocky Flats? If you create parks, what does that mean for existing facilities?

Mr. WADE. Well, I think we have to address them individually. Let me give you a couple of examples, Senator Wirth.

There is going to be an impact on Fernald because of the shutdown of N Reactor. We are looking at other means, both government and in the private sector, of supplying the depleted uranium that our programs will need in the outyears. If we are able to do so, that might lead to an orderly shutdown of the Fernald site.

Senator WIRTH. So, consolidation, as is the general consensus now at DOD, consolidation would entail a phasing out, closing, or moving of some of the existing nuclear weapons production facilities.

Mr. WADE. It could very well. But again, with facilities such as Rocky Flats, if there were agreement between the administration and this committee and Congress that we should be looking at new plutonium facilities in the outyears, we already know that that is a process that is going to take, in addition to the billions of dollars, many, many years.

Because we will in fact have to build a new manufacturing capability elsewhere, bring it on-line, and there will be a period of time for 2 or 3 years when we will be operating two sets of facilities, as we bring one on-line and phase one out. That process is going to take a decade or longer.

Senator WIRTH. And it is within that process that you would justify the some $370 million that you have requested for the upgrade of Building 371 at Rocky Flats.

Mr. WADE. It has been our judgment, Senator Wirth, that irrespective of the decision we have to have Building 371.

I think if we had the ability to make the decision today, we are probably looking at operating in some fashion large parts of Rocky Flats for another 15 years. We will need, therefore, Building 371 to replace some of the processes that are in 771 and 776. And we will clearly need the chemistry in 371 for the ultimate cleanup of Rocky Flats.

So we believe that moving ahead with bringing that facility online is a prudent course of action, no matter which way we ultimately go.

Senator WIRTH. You can understand, in my final point, Mr. Chairman, and Mr. Wade, you can understand the concern that people who live in and around Rocky Flats and in the metropolitan area could have.

On the one hand you are asking for $370 million, which has an extraordinary look of permanency about it. And they would say, well, if we are going to do that, does that mean we are going to have Rocky Flats in our backyard forever? Or why do we not wait to put that money in until you tell us what the long-term future of Rocky Flats is going to be?

It is in a way the rock and the hard place. The rock is, if Rocky Flats is going to be there for 15 years, we want the plant to be as safe as we possibly can. But on the other hand, what is the justification for doing that if Rocky Flats is ultimately going to be part of this consolidation process?

It is a difficult dilemma, but we ought to try to have the answers to both items, you know, as we embark upon the $370 million renovation.

Just as a final note, I think your so-called off-ramps budgeting, which says that you can go to a certain point and then if that, you know, spend $18 million and then you go to the next level and the next level, makes a lot of sense, because we might find ourselves moving dramatically in a very different level and we would not have to spend the total $370 million.

Mr. WADE. We certainly are sensitive to that. We think we have put together a program which allows us to reach the decision points to get to these off-ramps.

I guess I would ask your help, Senator Wirth, in articulating to the people in Colorado, as we go further in this program, our story. The fact that when we make the decision Rocky Flats will operate as it is now operating for many, many, many years while we are replacing it.

Senator WIRTH. Well, I have said that, as you know, on many, many occasions, that you do not back up United Van Lines up to

Rocky Flats and move it away tomorrow. And it is going to be a long process.

Mr. WADE. I know some would like that.

Senator WIRTH. Well, that is right, but that is an unrealistic alternative and we know that. But we do want to have the kind of thoughtful process built in that you are working on, and I want to again thank you for a really good piece of work that you are embarked upon.

I know how complicated, difficult, and ultimately expensive it is going to be, but you are doing a terrific job, and I want to thank you very much. Thank you, Mr. Chairman.

Senator EXON. Thank you very much, Senator Wirth.

Senator WIRTH. If I might, Mr. Chairman, I will have a series of other questions. If I might, I would like to submit them for the record.

And I see the gratitude on your face when I said I would submit them for the record.

Senator EXON. I was delighted.

Senator WIRTH. I would say that that gratitude does not show on the record other than verbally. [Laughter.]

Senator EXON. I will say now that Senator Wirth and others may have some additional questions, Mr. Secretary, for the record, and we would appreciate your considering them and responding at the earliest possible time.

Mr. WADE. I would be pleased to do so, Mr. Chairman.

Senator EXON. With that I am pleased to recognize Senator Thurmond.

SPECIAL ISOTOPE SEPARATION

Senator THURMOND. Thank you very much, Mr. Chairman. Mr. Chairman, I will propound a few questions to Mr. Wade.

Mr. Wade, do you expect any opposition, environmental or otherwise, to the special isotope separation facility?

Mr. WADE. There is opposition, Senator Thurmond. I had the privilege of testifying at a public hearing last Friday night on the SIS Environmental Impact Statement, a public hearing in Idaho Falls where I appeared with Senator Symms.

There is opposition, as one would expect. There is always opposition to anything nuclear. And there is that kind of opposition to the Special Isotope Separation plant.

NUCLEAR TESTING

Senator THURMOND. Mr. Wade, and Dr. Barker, I will ask you both to answer this question. The DOE nuclear testing program seems to be moving in the direction of fewer, more complicated, and therefore more expensive tests.

What is the implication of this trend relative to maintaining a cadre of nuclear weapons experts? Would more less complicated tests contribute more to our overall nuclear weapons research base?

Mr. WADE. Let me begin, and then ask Dr. Barker to elaborate.

I think we are trying to find the balance, Senator Thurmond. With new diagnostic techniques, we are certainly able to learn more per test than we were able to in the past. And there are certain kinds of tests where that has become very important to us.

There are other testing needs that are much simpler, and I think we are struggling to find the right balance. We are constrained by resources and part of the modernization study will look at the R&D requirements in the outyears to see if we can determine just exactly what kind of test program we need to support the national deterrent.

Senator **Thurmond**. Do you understand the question, Dr. Barker?

Dr. **Barker**. Yes, I do, Senator Thurmond. In 1966, right out of graduate school, I started work as a nuclear weapons designer, and there is nothing more humbling than a nuclear test to let you get full appreciation for the limited capabilities of computers and your own intellect.

It is nuclear testing that brings reality to the whole design process, and I firmly believe that it is only through nuclear testing that we have any basis for confidence in our stockpile.

Let me leap to the current time. Secretary Carlucci has testified many times that in the aftermath of the budget summit, we had to make some very tough decisions with respect to budgetary issues within the 050 account.

The Defense Department had to make tough decisions. The Department of Energy had to make tough decisions. In some areas, we worked together through the forum of the Nuclear Weapons Council.

Secretary Carlucci pointed out that we took risks because of the cuts that we took. I think that Mr. Wade would be among the first to say that certain risks were taken in the cuts that were absorbed within the Department of Energy budget, and some of those risks were in the nature of the cuts that had to be taken in the testing program.

I have previously testified this month that I personally believe that that issue, the issue of cuts in nuclear testing, is one that we really ought to take a look at again and ask ourselves the question whether we have taken too many risks, whether the risks we have taken are too high.

I certainly encourage this committee to continue to ask the kind of question that you have just asked, Senator Thurmond.

I think maybe we have cut nuclear testing a little bit too much, and that in future budgets we ought not to be taking the risks that we have taken with this one as far as nuclear testing is concerned.

Senator **Thurmond**. Mr. Wade, do you have any concerns that verification measures being considered for START could compromise sensitive nuclear design information?

Mr. **Wade**. That is a concern, Senator Thurmond. And I am pleased to say that our laboratories are playing a role in determining just exactly how serious that problem is or is not. It certainly is a potential problem.

Senator **Thurmond**. Mr. Wade, the research and development budget provides inflationary budget to the ICF and nuclear-directed energy accounts, but not to the Core program.

Does this reflect the Department's priorities for the research and development effort?

Mr. **Wade**. It is a fact that the Core program is being reduced slightly as a result of the budget constraints.

We regret that that has to be done again. We were laboring under the budget summit, trying to find the right balance, and we believed that a slight reduction in the Core program was an appropriate thing to do.

Senator **Thurmond**. Mr. Wade, how much is included in the fiscal year 1989 budget request for modification to the N Reactor? And what is your assessment of the practicality of ever restarting that reactor in the future?

Mr. **Wade**. I will provide details for the record, Senator. I believe there is about $150 million in my fiscal year 1989 request for N Reactor.

That request will allow us to defuel the reactor, to mothball the systems, and put it in "cold standby." It is not clear that the reactor will ever be needed again. But we certainly view it as an insurance policy and believe that a prudent thing to do is to maintain it in a condition where it could be restarted for at least the next 4 or 5 years until the SIS plant is well underway.

[The information follows:]

N Reactor Budget Request for Fiscal Year 1989

The congressional budget request for fiscal year 1989 contains $158.6 million intended for N Reactor. Of that amount, $2 million will be spent for final efforts on probabilistic risk assessments and the hydrogen mitigation system to complete Safety Enhancement Program activities. The remaining $156.6 million will be spent to place N Reactor in cold standby which includes the defueling of the reactor and placing the plant into layup condition consistent with NRC guidelines.

Senator **Thurmond**. I believe my time is up, Mr. Chairman.

Senator **Exon**. Thank you very much. We are pleased that Senator Humphrey is now here with us, and I am pleased to hear from you at this time, Senator Humphrey.

Senator **Humphrey**. I have no questions, Mr. Chairman.

DEFENSE BUDGET SUMMIT

Senator **Exon**. Thank you very much. Mr. Secretary, the budget summit provided for a 3-percent discretionary increase in funding for the national defense function.

Was any of this amount allocated to the Department of Energy defense programs? Or did this all go to other accounts?

Mr. **Wade**. I am not sure I am qualified to answer that, Mr. Chairman. After the budget summit, there was an initial allocation of the 050 account and the DP budget was derived arithmetically.

Subsequent to that, we met through the Nuclear Weapons Council and reworked that, reallocated money from 051 to 053. And I believe we did grow greater than the 050 average.

Senator **Exon**. I would like to ask Secretary Barker to give his comments on what has been discussed here this morning, with regard to the possible transfer of submarines and nuclear technology via Great Britain to the Canadians.

Could you state how you feel about that? And what to your knowledge has been done or not done in this area to date?

Dr. **Barker**. I believe that Secretary Herrington gave a very accurate picture of the current state of play. It is an issue that is under consideration within the administration. We are having extensive discussions with the Canadians as well as with the British.

There are extensive discussions within the administration with respect to the position that should be taken, Mr. Chairman. And I think it is premature at this time to speculate on what the ultimate outcome of those deliberations will be.

I assure you that I think all of the issues that Secretary Herrington raised are being given full consideration within the administration, in the process of coming to a final decision on that matter.

Senator THURMOND. Mr. Chairman, if you will excuse me, I have to go over to Antitrust and I have a few questions that I would ask Mr. Wade to answer for the record.

Mr. WADE. I would be pleased to do that, Senator.

Senator THURMOND. We are pleased to have you with us, Mr. Wade, and Dr. Barker, we are happy to have you with us too.

Senator EXON. Thank you, Senator Thurmond. Let me follow up on that just a little bit.

I have talked with Secretary Carlucci about this. He has some concerns that have been expressed by others in the administration. Have you discussed this proposition with the Secretary?

Dr. BARKER. I have been present in meetings when these issues have been discussed, yes sir.

Senator EXON. Can you describe for us what actions, to your knowledge, the Secretary has taken with other administration officials, pro or con, on this issue, particularly with regard to the State Department?

Dr. BARKER. I would like to take that question for the record if I could, Senator.

[The information follows:]

Canada has embarked on an ambitious maritime modernization program, with a focus on the SSNs. They have indicated that they will want extensive foreign support. Initial discussions helped us understand the broad thrust of the Canadian program, but there were many specifics missing that precluded the U.S. from making a full, early assessment. The administration, therefore, established an interagency group of the Departments of Defense, Energy, and State, working under the National Security Council to develop a U.S. Government position on the Canadian request to purchase UK nuclear-powered attack submarines. Initial consensus was that a U.S. decision required a more detailed understanding of Canadian intentions and plans. With that in mind, we proceeded toward a structured dialogue in a framework which recognized the nature of the U.S./Canadian relationship, and which kept reasonable possible policy options open to us. We allowed the UK to meet with the Canadians for substantive technical discussions, to explore Canadian intentions, and develop the information needed to access the Canadian effort. Extensive discussions have occurred between the Departments of Defense, State, and Energy on these issues, and they will no doubt continue as the administration position is being determined. There are many important issues and considerations in these matters, and so a hasty decision will not be made. I cannot give you any further administration position at this time because the President and administration have not yet made a decision.

REACTOR SAFETY ISSUES

Senator EXON. Thank you very much. I will go back to you then, Mr. Wade.

I want to get back a little bit about improving the safety at and the health of the DOE facilities, which is a keen consideration in this committee and on the floor of the Senate, and by Members of the Senate that I have discussed this with on many occasions.

What steps is the Department taking to implement the recommendations of the National Academy of Sciences on safety issues at the defense production reactors? How many recommendations have been implemented? How many are still pending? And how is that reflected in the 1989 budget?

Mr. WADE. Defense Programs is taking action on all the recommendations in the NAS Report. There were 17 technical recommendations. We are addressing all 17 of those.

Some, for example, having to do with additional safety systems and additional analytical requirements at Savannah River will take some time, and the 1989 budget request has in it $88 million specifically for the purpose of addressing NAS recommendations at Savannah River.

I will provide, if I may, for the record a detailed breakdown of just where we are with all 17 recommendations.

Senator EXON. I understand, and that would be very helpful.

[The information follows:]

NAS RECOMMENDATIONS

The Department is currently in the process of pulling together an agency-wide implementation plan to address the entire NAS Report. This plan is expected to be completed in May 1988 and we will provide a copy of it to the committee at that time.

INERTIAL FUSION PROGRAM

Senator EXON. Can you please explain the contribution of the inertial confinement fusion program to the national security and the priority of this program within the DOE's overall budget priority?

Mr. WADE. Let me give you an answer. I would really need to elaborate in a different forum, Mr. Chairman, in a closed session.

We do believe that the Inertial Fusion program is a major contributor to the weapons design efforts. From the physics of the kinds of experiments that they are able to do with the inertial fusion machines, we are able to extrapolate those results to design activities. So we believe it is a useful part of the overall weapon design program.

Senator EXON. When you answer that question, for the record, and I think it is best that we not get into a closed session this morning, but if necessary as a part of your explanation of that, if you want to put a classification on that please do so, because we are very much interested in what your thoughts are on that issue.

[The information follows:]

CURRENT AND PROJECTED MILITARY BENEFITS

Current military benefits include studies of highly-compressed, high temperature matter (e.g., opacity and radiation transport), and research into nuclear directed-energy concepts (x-ray laser). These experiments are conducted using the NOVA laser. Maximum projected military benefits are based on the Laser Microfusion Facility. Laser Microfusion Facility experiments can be performed on selected nuclear weapons physics issues pertaining to design, diagnostics, nuclear directed-energy weapons, nuclear weapons radiation effects simulation, and nuclear hardness and survivability testing.

Senator EXON. I just have two final questions of you for this morning. The first has to do with New Mexico and the budget in that regard as far as your Department is concerned.

WASTE ISOLATION PLANT PROJECT

First, since the recent report of the National Academy of Sciences on leakages which have occurred at the WIPP site, what savings can be realized for fiscal year 1989 by the reduction in waste to be emplaced at this plant? Is it significant?

Mr. WADE. It is not significant, Mr. Chairman. My understanding is during the 5-year experimental period, our original plan had been to shift 28,000 drums of waste to the Waste Isolation Pilot Plant.

That will be reduced only 2,000 drums as a result of the agreement with the National Academy. So there may be some slight difference in cost but certainly there will not be a large savings. We will watch that very carefully as this plays out.

Senator EXON. Finally, Mr. Wade, can you please explain why you have requested in your budget $43 million for road improvements in New Mexico at a time you acknowledge that the present budget cannot accommodate the requirements for the new production reactor?

Now, I recognize that the new production reactor cannot be built for $43 million. But I have to say that there is a question in my mind with regard to priorities when I see items like that.

Mr. WADE. Well, Mr. Chairman, there was litigation in the State of New Mexico in 1981–1982. And one of the results of that was a stipulated agreement between the administration and the State of New Mexico that certain things would be done in New Mexico to allow the Waste Isolation Pilot Plant to proceed.

One of the things in the stipulated agreement had to do with improving roads in the State of New Mexico. It had been the State of New Mexico's and the Department of Energy's hope that the money for the roads in order to meet the administration's commitment would be in the Department of Transportation budget. But that did not happen.

So in order to allow the plant to open as scheduled this fall, and in order to carry out the administration's legal obligations per the stipulated agreement, we agreed to the $43 million figure. The Governor of New Mexico had said that without it we could not open the facility.

Senator EXON. So we have somewhat of a political and legal problem, and that is the answer to why you recommended the road building fund.

Mr. WADE. We are normally not, as you point out, sir, in the road building business.

NEW PRODUCTION CAPACITY

Senator EXON. Is there a need for the construction of more than one new production reactor? What are the most important criteria in this area?

And I would like to have some idea with regard to rank and order for the selection of the new production reactor.

Mr. WADE. Let me just very briefly describe the process that is underway.

There is a panel of one of Secretary Herrington's committees, the Energy Research Advisory Board, looking at the four candidate technologies, weighing those candidate technologies against criteria which we have supplied that subcommittee.

There is a separate committee, internal to the Department, looking at the three candidate sites. The schedule calls for both of those review bodies to provide to the Secretary their data in June.

And the Secretary will then choose for purposes of the National Environmental Policy Act a preferred technology and a preferred site. That will allow then the environmental impact statement to begin.

During the course of that environmental impact statement, all the sites will be reviewed and all the technologies reviewed. So at this time we do not have a priority either in site or technology.

The Secretary intends to make that decision in July. He has said many times that his basic criteria is first to meet the national defense needs of the Nation and then to build on that.

Senator EXON. Mr. Wade, thank you very much. Dr. Barker, thank you also for being here and filling in for the Secretary. You have been very responsive to our questions and I thank you on behalf of the committee.

I have statements submitted by Dr. Stephen O. Dean, president, Fusion Power Associates and by Mr. Robert L. McCrory, Professor and Director, Laboratory for Laser Energies, University of Rochester. I also have a statement by Patrick B. Long, chairman, KMS Fusion, Inc., Ann Arbor, Michigan. They will be retained in the committee files.

[Questions for the hearing record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

NUCLEAR MATERIALS COMPLEX STUDY

Senator EXON. Mr. Secretary, you are presently conducting a study of the future composition of our nuclear materials complex. What is your long-term vision for the future of the materials complex? How, if at all, is the work of this study reflected in the budget request you have presented us with today? How do you plan to incorporate the recommendations of that study into next year's budget?

Secretary HERRINGTON. As required by the Defense Authorization Act of 1988, the Department is conducting a study in conjunction with the Department of Defense to modernize the nuclear weapons complex. This study will examine the size and capacity of the complex needed to meet long-range national security objectives and ES&H requirements. While the results and conclusion of that study are not required until December of this year, a number of preliminary assessments have been done over the past few years. These have indicated a need for certain major initiatives such as a New Production Reactor, SIS, waste management, and remedial action programs. Once completed and approved, the Modernization Study will serve as the basis for all future considerations for facility improvements and upgrades.

Senator EXON. Mr. Secretary, is the construction of a New Production Reactor an urgent national priority? If so, what can be done to accelerate the Department's schedule? Why does it take 12 years to bring a new production reactor on line? How do you plan to spend the $60 million that is requested for a New Production Reactor for fiscal year 1989?

Secretary HERRINGTON. Yes, the construction of new production reactor capacity is needed to assure that goal quantities of tritium can be produced for defense applications. A new reactor could be operational in the late 1990s. The current production reactors at the Savannah River Plant will be over 40 years old by then.

The Department is being assisted in the evaluation of candidate reactor technologies by the Energy Research Advisory Board (ERAB). As part of this evaluation process, the ERAB is examining options for the deployment of new production reactor capacity on an urgent schedule.

The Department has not yet established exactly how long it will take to acquire new production reactor capacity. Ten years is being used as a planning estimate pending development of a firm schedule. Actual time requirements will depend on the reactor technology selected, the design features determined to be necessary for safety, the site selected, and funding availability. The schedule will also be highly dependent upon the amount of time required for safety and environmental reviews. The EIS process will likely take two years to complete and must be finished prior to beginning definitive design.

In fiscal year 1989, the Department has requested $60 million to proceed with NEPA documentation and conceptual design.

FUNDING ISSUES

Senator Exon. How has the Department provided for environment, safety, and health issues in its fiscal year 1989 budget and how does this compare with last year's funding level? What are the highest priority sites for environmental cleanup and what is the estimate of the overall cost associated with such activities?

Secretary Herrington. The Department's estimate for environment, safety, and health compliance related expenditures for fiscal year 1989 is $1,524,000,000. The comparable figure for fiscal year 1988 is $1,153,300,000.

The Department has designated the following facilities as its highest priority from the standpoint of RCRA and CERCLA/SARA compliance: Lawrence Livermore National Laboratory, Hanford, Savannah River Plant, Los Alamos National Laboratory, Oak Ridge Site, Idaho National Engineering Laboratory, Mound Plant, Feed Materials Production Center, and Brookhaven National Laboratory.

The Department is in the midst of evaluating the overall environmental cleanup cost for the Defense Programs facilities and will report its findings to the Congress on July 1 of this year. Similar estimates for all DOE facilities will be reported to the Congress in a later report due at the end of 1988.

Senator Exon. Mr. Secretary, what is your highest funding priority for DOE's atomic energy defense activities? If you were given more funds, to which program or activity would your next dollar go?

Secretary Herrington. The DOE and DOD have worked very close to balance program and funding requirements within the constraints of the Defense Budget Summit guidelines of 1988. A larger share of funding above that funding envelope would have to be directed to those activities that are most likely to stress our aging complex's capacity to meet weapons production and materials requirements in the near term. While we have undertaken aggressive programs to assure that our operations are safe and environmentally sound, the complex is 30-40 years old and is stretched to its limits.

A long range plan to modernize the nuclear complex is being developed to assure the capability and capacity necessary to support an effective nuclear deterrent for the future. In the interim, we must continue to operate and meet our jointly established weapons and materials requirements, so a share of near term additonal resources that might be forthcoming would be applied to fund our most critical regulatory environmental and safety needs.

Senator Exon. Mr. Wade. Why will the Department be unable to accommodate the requirements for highly enriched uranium in the future? What is the impact, if any, of the legislation on Uranium Revitalization passed yesterday by the Senate on the price of uranium for defense purposes?

Secretary Herrington. DOE can accommodate the requirements for highly enriched uranium for defense purposes and does not envision the need to purchase uranium for defense purposes in the foreseeable future. Therefore, Senate passage of S. 2097, the "Uranium Revitalization, Tailings Reclamation, and Enrichment Act of 1988," should have no impact in this regard.

NPR SELECTION PROCESS

Senator Exon. Mr. Wade, can you explain the process the Department is using to select the site and technology for a new production reactor and where the Department is in that process?

Secretary Herrington. The Department has established a Site Evaluation Team to evaluate potential sites for new production capacity. The team is chaired by the Manager of the Department of Energy's San Francisco Operations Office and includes senior DOE managers from each candidate site. The team is charged with providing siting criteria to the DOE Energy Systems Acquisition Advisory Board (ESAAB) which is chaired by the DOE Under Secretary. The team is now evaluating each of the candidate sites against the siting criteria and will provide their findings to the ESAAB. The Department will evaluate the findings of the Site Evaluation

Team and will designate a preferred site or sites for new production reactor capacity in a final report to Congress, which will be submitted in July 1988.

The Department has asked the Energy Research Advisory Board (ERAB) to review alternative reactor technologies and to report its findings to the Department. An ERAB Panel, chaired by Lawrence T. Papay, has been established and has initiated the review process. The ERAB has received input from industry proponents of each technology to assure that the current status of technology for each reactor type is considered. The ERAB is now evaluating the candidate technologies against the technology evaluation criteria and will provide their findings to the ESAAB. The Department will evaluate the findings of the ERAB and will designate the preferred technology(ies) in a final report to Congress, which will be submitted in July 1988.

MODERNIZATION STUDY

Senator EXON. What are the principal criteria for modernization of the nuclear materials complex?

Secretary HERRINGTON. The charter for the Modernization Study calls for DOE, in conjunction with DOD, to determine the overall size and productive capacity necessary to support long-range national security objectives. The Study will provide a plan for the modernization of the complex to include options for upgrades, consolidations, and cleanup. To assist in this Study, DOD is providing a projection of 20-year stockpile requirements and several case scenarios. DOE will use these cases to develop plans for the necessary production and research base, assuring that all future facilities are in full compliance with environmental laws and regulations and compatible with commercial practices. In addition, the plan would maintain and improve the safety of current facilities and bring existing plants into environmental compliance.

NUCLEAR MATERIAL SUPPLY

Senator EXON. What are the contributions of each of the following methods of plutonium processing to meet requirements: recycle of material from retirements; reprocessing of existing inventories; and operation of the three remaining Savannah River reactors?

Secretary HERRINGTON. Plutonium for new weapons comes from retired weapons, reactor production, blending of reactor production with existing inventory of non-weapon grade plutonium, and recovery of non-specifications (scrap) weapon grade plutonium.

The estimated contribution of each of these sources is:

[Kilograms of Plutonium]

	1988	1989	1990	1991	1992
Retirements					
Reactor Production					
Blending			[Deleted]		
Scrap Recovery					
Total					

The scrap recovery quantities include Accelerated Residual Recovery.

Senator EXON. The Special Isotope Separation Facility is not scheduled to begin operating until fiscal year 1995. A new production reactor is to come-on line by 1998. Why are we planning to invest $1 billion on a facility that will only be needed for 4 years? Why are such processes as scrap recovery and retirements of older warheads not sufficient to meet our Nation's needs?

Secretary HERRINGTON. The primary mission of the Special Isotope Separation (SIS) plant would be to produce weapon-grade plutonium from DOE-owned fuel-grade plutonium, without being dependent on reactor availability. While scrap recovery and the retirement of older warheads will contribute to the supply of weapon-grade plutonium, an SIS plant is needed to provide a prudent level of flexibility, technological diversity, and contingency in the production of nuclear materials for defense applications.

The question implies that a new production reactor capacity would alleviate the need for the SIS after 4 years. This is not the case, however. SIS has a full 7-9 year plutonium production mission with likely follow-on missions. [Deleted.] The primary mission for new production reactor capacity, on the other hand, would be to assure that tritium can be produced for defense applications. The full production capacity of the reactor is needed to meet the projected goal quantities of tritium. Although the reactor would be capable of conversion for plutonium production as a secondary mission, the proposed reactor designs are optimized for the higher priority tritium production mission.

Senator EXON. Mr. Wade, what has happened in the last year that led to the decision to upgrade Building 371?

Secretary HERRINGTON. Over the past year, DOE has continued to examine the requirements for modernizing the plutonium residue recovery operations at Rocky Flats. This has included examining a GAO report requested by Senator Wirth to determine alternatives to rebuilding 371 and also the possibility of relocating all plutonium operations to another site. A study to determine the future configuration of the weapons production facilities is also underway.

It has been concluded that the renovation of Building 371 is a cost effective and reasonable course to take to ensure recycling of plutonium residues generated at Rocky Flats at minimum cost and eventual reduction of the [deleted] tons of plutonium equivalent to backlogged residues. Building 371 would eventually be used to decontaminate the Rocky Flats site if a decision is made to move the operations from there. The Plutonium Recovery Modification Project has been submitted to Congress for fiscal year 1989 funding of $18 million.

Senator EXON. What is the Department's commitment to meeting the International Commission on Radiological Protection (ICRP) public dose standards under operating and accident conditions for existing production reactors and associated facilities?

Secretary HERRINGTON. DOE is committed to meeting all applicable radiation protection standards, including the recommendations of ICRP. The Department adopted the current ICRP standards for its operating facilities on August 5, 1985, including the "as low as reasonably achievable" (ALARA) principle. DOE facilities consistently operate at small fractions of the ICRP limits. DOE facilities also must comply with Environmental Protection Agency air emission limits (40 CFR 61) that, in general, are four times more restrictive than the ICRP limits.

The Department's public dose criteria for facility design and emergency response, for purposes of limiting dose to members of the public during and following accidents, are at least as restrictive as criteria recommended by the ICRP. The Department's criteria also are fully consistent with standards and guidance adopted by the EPA and the Nuclear Regulatory Commission. Public exposures that have resulted from accidents at facilities operated by DOE and its predecessor agencies have been few and minor in nature.

Senator EXON. Would the Department close these facilities if it is determined that they do not meet these standards?

Secretary HERRINGTON. It is the Department's policy to comply with all applicable environment, safety, and health (ES&H) requirements and standards. DOE would either curtail or suspend operations at our facilities to assure compliance with applicable ES&H standards.

NEW PRODUCTION REACTOR(S)

Senator EXON. Describe the process being used to select the new production reactors and the proposed schedule for deployment of both the first and second plant.

Secretary HERRINGTON. An assessment of new production reactor capacity technologies has been undertaken by the Department's Energy Research Advisory Board (ERAB). The reactor technologies being reviewed for the NPR include: (1) Low Temperature Heavy Water Reactor; (2) Light Water Reactor (WNP-1 and special design production reactors); (3) High-Temperature Gas-Cooled Reactor; and (4) Liquid Metal Reactor. Each candidate technology will be evaluated with regard to the primary mission of providing an assured supply of tritium to sustain our nuclear deterrent. Conversion to plutonium production is also being evaluated for each technology as an alternate mission, should this prove necessary in the future. Following an assessment of these technologies by an Energy Research Advisory Board Panel, the Department's Energy System Acquisition Advisory Board (ESAAB) will designate preferred technologies for the NEPA process and the design of one or more production reactors. The Department, after reviewing the findings of the ERAB, will designate the preferred technology(ies) in a final report to Congress in July 1988.

Senator EXON. What is the Department's philosophy concerning the need for site duality and technology duality/diversity?

Secretary HERRINGTON. Site duality and technology duality/diversity offer some advantages in assuring a secure source of tritium. These advantages will be considered by DOE in arriving at a recommendation. The Department's recommendation will be in the final report to Congress in July 1988.

Senator EXON. What is the philosophy being used concerning the ability of each plant alone to meet national security production requirements?

Secretary HERRINGTON. It is likely that projected tritium demands can be met with a single reactor, depending on the demand scenario considered and the capability of the reactor concept selected. A second reactor, if constructed, would provide redundancy and diversity. The modular reactor design concepts offer flexibility, as well as making it possible to "build-in" some redundancy. These benefits will be carefully considered in the evaluation process. The Department's recommendation on this issue will be in the final report to Congress in the July 1988 timeframe.

Senator EXON. How does the selection process consider the risk of failure to complete the new production reactor on schedule?

Secretary HERRINGTON. The selection process is placing emphasis on factors such as tritium production assurance, safety, and an urgent schedule in designating a preferred technology for new production reactor capacity. Specific schedule estimates and assessments of schedular risk will be considered as part of the ERAB's technology evaluation process.

Senator EXON. How will DOE prove that the new production reactor will meet commercial safety requirements? How will you convince the public that these facilities have safety comparability to commercial reactors?

Secretary HERRINGTON. The Department will make a concerted effort to communicate to the public the low risk associated with the new DOE defense reactor(s). Probabilistic risk assessments will be performed so that we can compare their safety to the level of safety afforded by licensed commercial reactors. Our sites provide a significant benefit to assure minimal risk to the public, both by their remote locations and by their large exclusion areas. In the evaluation of candidate reactor technologies for new production reactor capacity, safety is a primary consideration. Passive and enhanced safety features will be incorporated into the designs. Additionally, both defense in-depth and probabilistic risk assessment approaches will be used to assure that the new production reactor capacity sets the standard for future reactor safety.

Senator EXON. How will safety oversight be performed for the design, construction, and operation for the new reactors and associated facilities?

Secretary HERRINGTON. The Department has recently taken major steps to strengthen and focus our Environmental, Safety, and Health programs. Our intention is to ensure that we are "technically vigilant" of our safety responsibilities, including our responsibility for the New Production Reactor(s) and associated facilities. To assure this, the Advisory Committee on Nuclear Facility Safety has been established to oversee the Department's commitment to safety. This committee will report directly to the Secretary of Energy on the status of the safety activities.

Senator EXON. If existing facilities are employed, what is the Department's commitment to upgrade these facilities to meet safety standards that are least equivalent to those for the new production reactors?

Secretary HERRINGTON. The current schedule calls for initial operation of new production reactor capacity and support facilities in the late 1990s. Until a site and reactor technology are selected, it is uncertain as to which, if any, new support facilities will be needed. Those that are not new will be carefully assessed and upgraded as necessary to assure that they meet contemporary safety and environmental standards. A high level of safety will be maintained to protect these essential national defense assets against an accident or extended outage.

Senator EXON. As you know, the Process Facility Modification (PFM) construction at Hanford has been terminated. Given the PFM was designed to provide feed material for Special Isotope Separation (SIS) from Fast Flux Test Facility (FFTF) fuel, describe the SIS implementation plan. What are the uncertainties associated with operation date, design, annual throughput, source of feed material, and quantity of feed material?

Secretary HERRINGTON. Currently, DOE is assessing the feasibility of various fuel decladding schemes other than PFM that would be used to recover DOE-owned plutonium in the FFTF spent fuel. The various schemes being assessed include the decladding of the FFTF fuel at a DOE facility, either within the PUREX facility at Hanford or at the Savannah River Plant (SRP), or at an existing NRC-licensed facility. Subsequent processing of the decladded fuel would be done at either the Hanford site or the SRP.

It is important to note, however, that the FFTF spent fuel is not the only source of SIS feedstock. Other sources are N Reactor spent fuel and a smaller amount of scrap and current inventory at Hanford. These will be prepared at existing facilities. It is not expected that the termination of the PFM will have any impact on plant operation, annual throughput, or sources and quality of feed material.

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

NUCLEAR MATERIALS REQUIREMENTS

Senator KENNEDY. Do the projected nuclear materials requirements in the current Stockpile Memorandum protect the option of producing one or more of the following: More than 925 nuclear artillery shells? Nuclear warheads for the ATACMS? Warheads for an additional 50 MX missiles? [Deleted.]

Secretary HERRINGTON. [Deleted.]

Senator KENNEDY. Will retirement of the W-33 and W-48 nuclear artillery warheads be completed within the next 5 years, and are these retirements anticipated in current nuclear materials production requirements?

Secretary HERRINGTON. [Deleted.]

Senator KENNEDY. Approximately what fraction of the projected requirements for plutonium, highly enriched uranium, and tritium over the next decade can be met from weapon retirements, based on each of the following assumptions: no agreement on strategic arms reductions/continuation of presently authorized programs; implementation of 50% reductions; implementation of INF reductions?

Secretary HERRINGTON. Responding to each of the three scenarios:

(a) In the continuation of presently authorized programs, weapons retirements will meet the following percentages of material requirements over the next decade: [deleted] plutonium, [deleted] enriched uranium, [deleted] tritium.

(b) In the implementation of 50% reductions in strategic arms: The requirements for nuclear materials could be dramatically altered by the implementation of a 50% reduction in strategic arms. However, without knowing a specific scenario and force structure, it is not possible to assess the fraction of material requirements met by retirements.

(c) The implementation of the INF reductions has virtually zero impact on nuclear material requirements. All of the INF weapons that will be retired were already programmed for retirement. [Deleted.] This will result in the net savings of [deleted] tritium over the next decade.

Senator KENNEDY. What specific impact would the presently contemplated START reductions have on the requirements for nuclear materials until the year 2000, and how does this compare with the availability of recycled nuclear materials from already planned or anticipated weapon retirements over this same period?

Secretary HERRINGTON. A START agreement would no doubt alter our requirements to produce plutonium, highly enriched uranium, and tritium. The specific change in demand is impossible to calculate without a specific force scenario. Without regard to scenario, a continued, secure source of tritium is required.

Senator KENNEDY. [Deleted.]

Secretary HERRINGTON. [Deleted.]

Senator KENNEDY. Does the DOE still intend to resume production of highly enriched uranium for weapons during the next 5 years? During the next 10 years?

Secretary HERRINGTON. Yes, the Energy Department does expect to produce highly enriched uranium for the weapons program during the next 5 years.

Senator KENNEDY. Will requirements for plutonium and tritium production be reduced as a result of the ratification of the INF Treaty? Please quantify your answer in terms of reactor-days or -years?

Secretary HERRINGTON. The INF Treaty will generate a slight reduction in the requirements for plutonium and tritium production. The total benefit of this treaty will be somewhat [deleted].

Senator KENNEDY. How many production reactors on average will be devoted to tritium production during each of the next 5 years, beginning October 1, 1988? How many production reactors will be devoted to plutonium production during the same period?

Secretary HERRINGTON. If the Savannah River (SR) reactors return to near full power on the currently planned schedule there will be an average of 2 production reactors devoted to tritium production and one will produce plutonium. Should the reactors remain at the current operating power levels of about 50% of full power then all three SR reactors will be required to produce tritium with no reactors producing plutonium. Under this scenario plutonium requirements would have to be met through increases in retirements and scrap recovery.

Senator **Kennedy**. Please specify all sources of plutonium for new weapons. Please include the estimated amount in each category for each of the next 5 years, beginning October 1, 1988.

Secretary **Herrington**. Plutonium for new weapons comes from retired weapons, reactor production, blending of reactor production with existing inventory of non-weapon grade plutonium, and recovery of non-specification scrap weapon grade plutonium.

The estimated contribution of each of these sources are:

[Kilograms of Plutonium]

	1988	1989	1990	1991	1992
Retirements					
Reactor Production					
Blending			[Deleted]		
Scrap Recovery					
Total					

Senator **Kennedy**. Please describe the future of plutonium blending operations at Savannah River.

Secretary **Herrington**. DOE plans to continue blending operations at Savannah River (SR), by which fuel grade plutonium is blended with high purity plutonium, as long as it is economically sensible and technically feasible. The ability to blend, however, relies on continued production of high purity plutonium. This production is dependent on our ability to return the SR reactors to near full power on the currently planned schedule.

SPECIAL ISOTOPE SEPARATION (SIS) PLANT

Senator **Kennedy**. Please describe, as clearly as possible, the specific national security missions and plutonium feedstocks for the SIS plant as a function of time in the post 1997 period.

Secretary **Herrington**. The primary mission of the SIS plant is to produce weapon-grade plutonium from existing DOE-owned defense program origin fuel-grade plutonium. It would do so without being dependent on reactor availability to produce plutonium of higher than weapon-grade purity; that is, weapon-grade plutonium with plutonium-240 content of around 3 percent, for blending. This mission will be accomplished in the 7- to 9-year period after the fiscal year 1995 startup. In addition, the SIS plant could be expanded in a relatively short time and would provide the capability and flexibility to more readily respond to potential increases in approved weapon grade plutonium demands.

Most of the plutonium feedstock for the SIS plant will come from N-Reactor and FFTF spent fuel. Smaller amounts are in the form of existing defense programs-origin scrap and inventory material stored primarily at the Hanford site.

Senator **Kennedy**. Given that a New Production Reactor will provide a backup production capability for plutonium after 1999, why is the additional capacity of the SIS plant required?

Secretary **Herrington**. The primary mission for new production reactor capacity would be to assure that goal quantities of tritium can be produced for defense applications. The full production capability of the reactor is needed to meet the projected tritium requirements. Although the reactor would be capable of conversion for plutonium production as a secondary mission, the proposed reactor designs are optimized for the higher priority tritium production mission. The SIS plant would have the primary mission of producing weapon-grade plutonium from DOE-owned fuel-grade feed material.

Since the Savannah River Plant reactors will be over 40 years old at that time, the NPR and the SIS plant could represent the Nation's primary sources of tritium and weapon-grade plutonium, respectively, in the late 1990s.

Senator **Kennedy**. Can you envision any national security environment in the late 1990s and beyond that would not require the capabilities represented by the SIS plant?

Secretary **Herrington**. The SIS plant will be a valuable resource and it is likely that follow-on missions will be established and carried out throughout its design life.

The SIS facility would provide a unique capability to apply the atomic vapor laser isotope separation technology to other potential isotopic separation production missions.

Senator Kennedy. In an environment of 50 percent reductions in strategic missile warheads, why would we need capacity represented by the SIS plant? In such a case, would the primary mission of the SIS plant become the "clean-up" of recycled weapons plutonium?

Secretary Herrington. The decision to deploy and maintain the SIS capability to produce weapon-grade plutonium in the future, should the need arise, would be reevaluated by the Department in such an environment. Other missions such as the "clean-up" of recycled weapons-grade plutonium, as well as providing other plutonium isotopes for defense applications, would be reviewed as to their necessity and could constitute important alternative missions.

Senator Kennedy. If forced to choose for budgetary reasons, am I correct in assuming that a safe, reliable source of tritium for the stockpile is a higher national security priority than a backup "non-reactor" source of plutonium for the next century?

Secretary Herrington. Both tritium and plutonium are used in nuclear weapons. Over the next century sources for both must be provided to assure our national security position is maintained. These strategic nuclear materials have historically been produced in the Department's defense reactors to sustain our nuclear deterrent. The primary mission for new production reactor capacity would be to assure that goal quantities of tritium can be produced for defense applications, although such capacities would be capable of producing plutonium as a secondary mission. The primary mission for a Special Isotope Separation (SIS) plant would be to clean-up DOE-owned fuel-grade plutonium to meet weapon-grade specifications. The NPR will be mandatory for production of tritium for new warheads and to replace decay losses in the stockpile. The SIS plant would provide a reactor-independent source of weapons grade plutonium at a time when no other sources may be available.

Senator Kennedy. With respect to the SIS plant, why must we now construct an additional production capability for plutonium given the adequacy of current supplies through the 1990s and the overall trend towards reduction in nuclear forces.

Secretary Herrington. The demand for new weapon-grade plutonium, beyond that available from retired weapons or scrap recovery, varies each year. However, capacity to meet a potential demand increase takes many years to provide. We are currently estimating 5 to 6 years to construct the SIS facility. A new reactor would take much longer—about 10 to 12 years. Because large reductions in the number of nuclear weapons have not yet been agreed to, and since having the nuclear materials production capacity available is different from using it to support manufacture of additional weapons, we must still provide production capacity to meet potential needs.

A decision to interrupt project funding would disband a skilled and dedicated team. It then could take years for some future decision to proceed to recover even our present position. Such a decision could deny the Nation a critical material capability and weaken our defensive posture.

SIS TECHNOLOGY AND NONPROLIFERATION CONCERNS

Senator Kennedy. Do you have any proliferation concerns stemming from a United States effort to implement laser isotope separation technology for military purposes? Are similar efforts being mounted by other nuclear weapons states? By nonweapons states?

Secretary Herrington. The DOE estimates that plutonium laser isotope separation (LIS) technology, or Special Isotope Separation (SIS), would have no significant impact on the ability of a nonnuclear weapons state to produce plutonium for nuclear weapons. In fact, development of SIS technology would be very costly, time consuming, and unwarranted if only a few nuclear explosives were desired.

The DOE bases this estimate on the following facts:

Any reactor-produced plutonium, especially plutonium from low burnup fuel assemblies, once chemically separated in a reprocessing plant, could be used directly to make nuclear weapons.

An SIS production plant could enrich plutonium produced in reactors; it would not produce any new plutonium. Plutonium contained in irradiated fuel must first be recovered by chemical separation in a processing plant before it can be used as feed for an SIS plant.

We know of no potential interest in the utilization of SIS technology for military purposes by other nuclear weapons states, or by nonweapons states. [Deleted.]

Senator KENNEDY. Could a nonweapons state legally or illegally construct a small LIS module based on off-the-shelf components commercially available in the United States or other advanced industrial countries?

Secretary HERRINGTON. Plutonium LIS technology is a highly sophisticated technology not available to the vast majority of nonnuclear weapons states. Further, it is not expected to be available to those countries for the foreseeable future. Sensitive aspects of this technology are classified as Restricted Data. In addition, the export of technology or components for the separation of isotopes of source or special nuclear materials would be subject to the controls provided for in section 57.b(2) of the Atomic Energy Act of 1954, as amended, and Part 810 of Title 10, Code of Federal Regulations.

Senator KENNEDY. Please discuss the impact on nuclear weapons design and engineering of access to LIS technology by a nuclear weapons threshold state. Would access to such technology make the proliferator's job easier?

Secretary HERRINGTON. The DOE estimates that plutonium laser isotope separation (LIS) technology would have no significant impact on the ability of a nonnuclear weapons state to produce plutonium for nuclear weapons. In fact, development of LIS technology would be very costly, time consuming, and unwarranted if only a few nuclear explosives were desired.

The DOE bases this estimate on the following facts:

Any reactor-produced plutonium, especially plutonium from low-burnup fuel assemblies, once chemically separated in a reprocessing plant, could be used directly to make nuclear weapons.

A plutonium LIS production plant could enrich plutonium produced in reactors; it would not produce any new plutonium. Plutonium contained in irradiated fuel must first be recovered by chemical separation in a processing plant before it can be used as feed for a plutonium LIS plant.

Senator KENNEDY. Under what conditions would the DOE use the SIS plant to process plutonium from commercial nuclear power reactors for use in nuclear weapons? Is the Department concerned about the possible impact of this step on our nonproliferation policy and public attitudes toward the peaceful uses of atomic energy?

Secretary HERRINGTON. It is the policy of DOE to meet nuclear weapons program requirements through the use of dedicated DOE facilities within the nuclear weapons complex.

In keeping with Public Law 97-415, DOE has no plans to utilize plutonium provided from commercial nuclear power reactors for nuclear weapons, nor are proposals to take such a step under active consideration.

Senator KENNEDY. [Deleted.]

Secretary HERRINGTON. [Deleted.]

SIS PLANT AND ALTERNATE SOURCES OF PLUTONIUM

Senator KENNEDY. The DOE has stated in years past that it plans to purify plutonium in FFTF spent fuel at the SIS facility. If the Process Facility Modification to the Purex Plant at Hanford is canceled, when and how will the DOE reprocess FFTF spent fuel?

Secretary HERRINGTON. Currently, DOE is assessing the feasibility of various fuel decladding schemes that would be used to recover DOE-owned defense program origin plutonium in the FFTF spent fuel. The various schemes being assessed include the decladding of the FFTF fuel at a DOE facility, either within the Purex facility at Hanford or at the Savannah River Plant (SRP), or at an existing NRC licensed facility. Subsequent processing of the decladded fuel would be done at either the Hanford site or the SRP. Virtually all of the FFTF spent fuel plutonium will have been prepared as feedstock by the time the SIS facility is available for operation in 1995.

Senator KENNEDY. If the SIS/INEL facility is built, does the DOE plan to dismantle the prototype SIS facility at LLNL? What is the capacity of the Livermore facility, and how does it compare with the proposed Idaho plant?

Secretary HERRINGTON. The prototype SIS facility at LLNL is a valuable resource for future research for other processes, as well as potential follow-on SIS missions. Additionally, the laser facility at LLNL is shared with the Uranium Atomic Vapor Laser Isotope Separation Program which will continue to need it for several years past SIS demonstration. The Department, therefore, has no schedule for dismantling the prototype facility at this time.

This SIS plant is designed for production operations on a continuous highly-available basis. The facilities planned for performance verification at LLNL include many full-scale components and features but they do not include all system elements that would be required for operation in a production mode. As such, the output of these facilities would be a small fraction of the SIS plant planned at INEL.

Senator KENNEDY. If the purpose of the SIS plant is to provide a "non-reactor" capacity to meet, in the words of the fiscal year 1989 budget request, undefined "defense surge capacity requirements" in the long-term, rather than urgent near-term national security requirements, why not maintain the Livermore facility as the "non-reactor" option for producing plutonium?

Secretary HERRINGTON. The Livermore SIS facility is a small research and development facility and cannot be operated on a production basis. It will, however, have the capability to test full scale SIS plant components for process demonstrations. The DOE has no plans for large-scale plutonium processing at the Livermore site.

Senator KENNEDY. How large is DOE's supply of plutonium in the existing backlog of unprocessed manufacturing scrap or residue?

Secretary HERRINGTON. The backlog of residues amounted to [deleted] metric tons of plutonium as of September 30, 1987.

Senator KENNEDY. How much of this backlog can be reclaimed by the weapons program? Please provide a projection by year and amount, until the current unprocessed backlog has been exhausted.

Secretary HERRINGTON. Much of the backlog can be reclaimed within economic limits as can be seen in the following projection and technologies are continually assessed to work on the balance.

[In Metric Tons]

	Fiscal year—								
	1989	1990	1991	1992	1993	1994	1995	1996	1997
Projected ending inventory					[Deleted]				

Senator KENNEDY. The DOE is requesting funds for fiscal year 1989 to accelerate recovery of plutonium scrap and residues, including funding to rebuild a facility at Rocky Flats that will go on line at about the same time as the proposed SIS facility. In light of this additional source of plutonium, why is the SIS plant needed in the late 1990s?

Secretary HERRINGTON. Although the accelerated recovery of plutonium scrap and residues contribute to the supply of weapon-grade plutonium, an SIS plant is needed in the late 1990s to provide a prudent level of flexibility, technological diversity, and contingency in the production of nuclear materials for defense applications.

Senator KENNEDY. Is the primary purpose of SIS to allow the United States to respond to a "surge" in Soviet warhead production by permitting the clean-up of reactor grade plutonium? Where would DOE obtain such plutonium?

Secretary HERRINGTON. The primary mission of the SIS project is to produce weapon-grade plutonium from existing DOE-owned fuel-grade plutonium. This capability will provide a prudent level of flexibility, technological diversity, and contingency in the production of nuclear materials for defense applications. Unlike other methods of producing new weapon-grade plutonium, the SIS process provides a reactor-independent source of this material. It will provide needed contingency against either shutdowns or cutbacks in the existing complex, or an increase in the approved demand for weapon-grade plutonium.

Most of the plutonium feedstock for the SIS plant will come from processing N-Reactor and Fast Flux Test Facility spent fuel. Smaller amounts are in the form of existing scrap and inventory material, stored primarily at the Hanford site. All of the feed material is DOE-owned defense program origin fuel-grade plutonium.

Senator KENNEDY. Why is the N Reactor at Hanford being upgraded and placed in standby status if not to respond to the Soviet "surge" contingency?

Secretary HERRINGTON. The N Reactor at Richland will be placed in cold standby because of the reduction in requirements for new plutonium. We will complete those necessary safety enhancements so that the DOE could, if necessary, restart the reactor in the shortest possible time if the decision to do so was made. The investment now with experienced and knowledgeable people shortens the timeline to restart relative to the time required if we had to do those items when approved in the future. Restart could be required to meet nuclear materials demand should we experience an increase in requirements which could not be met by other sources. I view this as an affordable insurance policy toward our support of potential DOD needs.

Senator **Kennedy**. While I find it difficult to envision a national security emergency in which rapid production of plutonium would represent a rational response, nevertheless, given this assumption, could not large quantities of plutonium be produced directly in commercial light water reactors? In what way do the legal constraints on this option differ from those now preventing the use of civilian spent fuel as the source of feedstock for the SIS plant?

Secretary **Herrington**. The legal constraints would be the same for either of these options. The fiscal year 1982 authorization bill for the Nuclear Regulatory Commission (Public Law 97-415) specifically prohibits the use of special nuclear material produced in licensed facilities for nuclear explosives.

Senator **Kennedy**. What is the definition of "Soviet breakout" as the term has been used in reference to the SIS plant?

Secretary **Herrington**. "Soviet breakout" has been defined as a step function acceleration in nuclear weapons production and/or deployment. In this context, breakout refers to a significant, rapid increase in plutonium production, use, or production capacity which represents a threat to U.S. national security.

Senator **Kennedy**. Given the time required to build additional delivery systems to carry the additional warheads assumed by the request for a United States "surge capability," how long would the United States response actually be delayed by failure to deploy the SIS plant as requested? Is the DOE recommending as part of its SIS proposal that the United States maintain production lines for MX and Trident II missiles in perpetual readiness to respond to a Soviet breakout? How much is this likely to cost?

Secretary **Herrington**. Current DOE projections for nuclear material requirements indicate that, if currently operating production reactors at the Savannah River Plant return to full power operation, adequate plutonium supplies will be available [deleted] to meet forecast stockpile requirements. After the SIS capability is established, the processing of DOE-owned fuel-grade plutonium through the SIS plant will provide the required supply of weapon-grade plutonium independent of the production reactors in the event that they are not available. About 7 years will be required to design and build the SIS plant. Unless the schedule is maintained, its output would not be available if and when needed. The country could be without a secure supply of weapons grade plutonium.

The Department is not recommending that the MX and Trident II missile production lines be maintained in perpetual readiness to respond to a Soviet breakout.

Senator **Kennedy**. In light of accelerated scrap recovery, improved plutonium machining techniques, the backup plutonium capability of the NPR, recent unilateral reduction in obsolete tactical munitions, scheduled retirements of [deleted] Poseidon and other warheads, negotiated INF reductions, anticipated START reductions, and the option of hot or cold standby for existing production reactors at Hanford and Savannah River, please restate why SIS plant plutonium is projected to be needed in 1997?

Secretary **Herrington**. We are not saying that SIS plant plutonium is projected to be needed by 1997. Rather, DOE considers it the responsible path to assure that some form of new weapon-grade plutonium production capacity is available. Reactor-based direct production has proven to be vulnerable to various technical and non-technical issues, including aging, and continued operations of all three of the existing reactors at the Savannah River Plant beyond the mid-1990s is very uncertain. New production reactor capacity will be fully utilized for the higher priority tritium production, although as you know it would also be able to produce plutonium.

With respect to scrap recovery and reductions in deployed warheads, these do serve to reduce demand. However, the demand for new weapon-grade plutonium, beyond that available from scrap recovery and reductions in deployed warheads, is dependent on many factors and could change significantly, as it has in the past. Because of this, DOE believes the nation needs the nuclear materials production capacity to be able to respond to major increases in the demand for new weapon-grade plutonium. SIS is designed to provide that reactor-independent capacity at a reasonable cost and on a scheduled appropriate to our potential supply vulnerability.

A number of actions have been proposed which might affect the need for plutonium in the future. However, at this time, no significant action has been finalized which would eliminate the need for the SIS plutonium processing capacity availability in the mid 1990s.

DOE'S ROLE IN ARMS CONTROL

Senator **Kennedy**. Instead of hedging against the contingency of a Soviet plutonium production surge by spending billions of taxpayer dollars that could be spent on environmental cleanup and other human needs, has the DOE given any thought to directly constraining Soviet plutonium and HEU production by means of negotiated verifiable constraints on the capability?

Secretary **Herrington**. [Deleted.] The problem of directly constraining Soviet plutonium, tritium, and HEU production by means of negotiated verifiable constraints is large and complex. In a changing Soviet environment, directly constraining Soviet materials production would require extensive discussion as well as additional [deleted] research and analysis.

[Deleted.]

In terms of constraints on Soviet nuclear material production IAEA safeguards have been suggested as a model for developing some form of arms control. The Soviet Union is a nuclear weapon member state that is a party to the Non-Proliferation Treaty. One condition under the NPT allows an exemption of nuclear weapons state facilities from the application of full scale IAEA Safeguards. Accordingly, the United States and Soviet Union are exempt. However, through voluntary offers, each submits representative civil nuclear facilities for IAEA safeguard inspections. A related longer range problem for the nuclear arms control agenda is an accurate accounting of the total available nuclear material, particularly plutonium and HEU. The development of policies which directly address this will be a part of DOE's future verification research and development program, so that we will be better equipped to address this issue in the follow-on negotiations to START.

Senator **Kennedy**. Please provide a bibliography of classified and unclassified DOE-sponsored research into the feasibility of negotiated constraints on fissile material production.

Secretary **Herrington**. A comprehensive unclassified bibliographic listing is attached, extracted from the Sandia National Laboratories Report SAND 87-0901, "Restricting Production of Fissionable Material as an Arms Control Measure—An Updated Historical Overview." Also attached [deleted].

Extract from SNL Report SAND 87-0901,
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Senator **Kennedy**. Please describe DOE plans, if any, for sponsoring research in the area of fissible material production constraints and nuclear warhead dismantlement.

Secretary **Herrington**. [Deleted.] These types of studies are essential if constraints on nuclear materials production are to be considered. [Deleted.] DOE continues to address the possibility of plutonium, tritium, and HEU constraints, [deleted] dismantlement relative to START and INF. Expanded [deleted] research programs on dismantlement are being considered. [Deleted.]

Senator **Kennedy**. Is compatibility with arms control requirements, such as the need for on-site inspections, a design criterion which is being used to shape the recommendations of the 2010 Study?

Secretary **Herrington**. Arms control requirements will be among the criterion used to address the various scenarios the modernization study will consider.

Senator **Kennedy**. Is any thought being given to the design of facilities that would facilitate inspection, by relatively non-intrusive passive and active radiation measurement techniques, of warhead dismantlement, followed by safeguarded recycle or disposal of fissile materials?

Secretary **Herrington**. These questions are being addressed in a DOE-sponsored dismantlement study [deleted].

SEISMIC MONITORING RESEARCH

Senator **Kennedy**. In fiscal year 1988, the Senate provided significantly increased funding to accelerate the DSVS program. Yet the fiscal year 1989 Budget Request shows that the first five units will not be completed until the end of 1989, and that these units will cost $14 million?

Please explain why it is requiring three full years to produce 5 seismic monitoring stations?

When might the Congress expect production of the second five units?

How much additional funding and time would be required to produce an in-country monitoring network of 25 DSVS stations?

What, if anything, is DOE doing to overcome the delays in this program?

Secretary **Herrington**. Conceptual design of the DSVS began in fiscal year 1987. Actual fabrication of five DSVS stations began in January 1988 when fiscal year 1988 funding was received. Critical elements, e.g. seismometers, require long-lead times to procure and all stations must be fully integrated and undergo test and evaluation to ensure that performance specifications are met. The first of five DSVS stations will be completed in early fiscal year 1989 and the last in late fiscal year 1989. Fabrication of the second five units will begin in fiscal year 1989 with completion in fiscal year 1990. An additional $30M would be required to fabricate a total of 25 single seismometer DSVS stations. Fabrication of the stations could be completed by 1991. The DOE has given top priority to the DSVS program to provide the United States with state-of-the-art in-country seismic stations.

Senator **Kennedy**. A disinterested observer of DOE's seismic verification research program over the past several years might conclude that DOE has lost the initiative to pursue this particular mission, and that the function might better be performed by another government agency? Does the DOE wish to be relieved of the responsibility for developing advanced seismic monitoring equipment and advancing the state-of-the-art in seismic data analysis? If not, please describe how DOE intends to pursue a vigorous seismic research program?

Secretary **Herrington**. DOE has continued its seismic research program in the development of both sensor systems and analytical tools. The emphasis in DOE seismic verification activities has shifted from teleseismic monitoring to regional monitoring, however, with the concurrent development of the analytical capability for regional signals. The DOE interest in continuing an active program is exemplified by our design in 1987 and initial construction in 1988 of the Deployable Seismic Verification System. In the current and potential nuclear test treaty environment, DOE plans to continue an active and continuing program in the development of systems, technology, and analytical tools.

TEST-BAN READINESS PROGRAM

Senator **Kennedy**. Please describe the readiness of DOE's Albuquerque Operations Office to manage the remanufacture of well-tested nuclear warhead designs under the conditions of a low-threshold or comprehensive test ban. Is further study required, or is DOE Albuquerque presently in a position to respond to the following:

Based on the projected availability of components and materials over the next decade, which weapons presently in or entering the stockpile could be remanufactured without special provision for stockpiling in advance of unique components, tools and materials?

Based on unavailability of materials, tools, jigs, and design documentation, which warheads could *not* now be replicated without redesign or recertification by nuclear test?

Assuming special preparations were undertaken in advance to stockpile tools and materials and to carefully document all aspects of the original production design, which warheads now in stockpile could be remanufactured in the future?

Secretary HERRINGTON. There are many technical and policy issues associated with maintaining confidence in a national nuclear deterrent based on remanufactured nuclear weapons particularly in the face of future, unknown threats to our national security. In designing and developing nuclear weapons in recent years, increased emphasis has been placed on avoiding known materials compatability problems, improvements in weapon durability, and simplicity in manufacture. Attention has also been paid to improved documentation.

However, these efforts have always been made in the overall context of meeting the required military characteristics of the weapons to assure their effectiveness, the resources available in the DOE production complex, and the need to minimize costs. In addition, all weapons in the stockpile have been certified with the presumption that some nuclear testing would be conducted to assure confidence in their performance. Although the issue of maintaining confidence in remanufactured weapons has been examined informally for some weapon systems, each system is different and would require thorough analysis before any conclusions could be drawn. To date, no comprehensive study has been made of this matter.

QUESTIONS SUBMITTED BY SENATOR JOHN GLENN

ENVIRONMENT, SAFETY, AND HEALTH

Senator GLENN. Mr. Wade, you have testified that DOE's fiscal year 1989 funding request includes approximately $570 million for environmental compliance and protection. While this is indeed a substantial increase over the recent years, it pales in comparison to Under Secretary Salgado's estimate that total cleanup costs for DOE facilities will be in the range of $100 billion. What is the Department's long-term strategy for dealing with this mammoth cleanup task?

Secretary HERRINGTON. Over the last 2 years, the Department has been developing long range environmental, safety, and health (ES&H) plans for all areas of the Defense complex. These plans have been developed by each field site using assessments to identify total requirements for both current operations and environmental restoration. These plans are in the final stages of development and will be summarized in the report we will be providing to you in July of this year.

The Department plans to use these comprehensive long range plans to form the basis for all future programs and budget requirements as well as the ES&H considerations for the Modernization Study.

Senator GLENN. Mr. Wade, you have testified that inadequate funding for environmental, safety, and health requirements would not only impede progress in these areas, but would also adversely affect DOE's ability to assure production. I, too, believe that environmental, health, and safety improvements will benefit production in the long run through avoidance of debilitating accidents and restoration of public confidence in the defense production complex. Could you please elaborate on your testimony along these lines?

Secretary HERRINGTON. Adequate and timely funding for environmental, safety, and health (ES&H) requirements is essential for progress in these areas and to assure continuity of the Department's important national security mission. Good ES&H performance and reliable operation are inextricably linked as a practical matter when operating defense complex facilities. The safe and environmentally sound operation of a facility requires well trained and motivated operators and technicians, an effective quality assurance program, an aggressive maintenance and upgrade program, and continuous close and effective management involvement and assessment, etc. These same factors are also essential to efficient production operations. Furthermore, the public must be assured of the safe and responsible operation of the defense complex and local and Federal regulatory requirements must be met to assure continued operations. At the same time, the nature of operations makes it imperative to avoid major safety or environmental incidents if we are to assure continued operations.

INF TREATY

Senator Glenn. Could you elaborate on the kind of verification support DOE is providing for the INF Treaty and the proposed START agreement?

DOE Support of INF Verification

Secretary Herrington. The Department of Energy (DOE) and its National Laboratories are involved in the following activities in support of the verification requirement set forth in the INF Treaty: Perimeter-Portal Monitoring; and Warhead Radiation Detection.

The INF Treaty provides for the establishment of a Perimeter-Portal Monitoring capability at factories producing treaty limited items, i.e., SS–20s, in order to verify that such items do not exit from the factory after the treaty enters into force. Votkinsk is the site where the Soviet Union produces its SS–20s and will, if the treaty is ratified, be the location of a Perimeter-Portal Monitoring system manned by United States personnel.

Sandia National Laboratories is working in conjunction with DOE and the Department of Defense (DOD) to develop the necessary equipment and procedures needed to implement this Treaty provision. Such equipment includes X-rays, motion sensors, load weighing scales, and video surveillance cameras.

The INF Treaty provides for using radiation detection to detect the presence of nuclear warheads at missile operating bases (MOB) and support facilities or former MOB's or support facilities in order to distinguish between Treaty limited items and those that are not accountable under INF. [Deleted.]

Sandia and Los Alamos National Laboratories are jointly developing the necessary equipment under DOE supervision. Policy matters relating to the program are the subject of interagency meetings [deleted].

DOE Support of START Verification

DOE is actively involved in two major activities intended to ensure that a START agreement is adequately verifiable: Interagency negotiations to establish treaty protocols that spell out verification rights, provisions, and procedures, and verification technology development.

To date, U.S. proposals for a START agreement have built upon many of the innovative verification requirements contained in the INF Treaty; i.e., On-Site Inspection, Perimeter-Portal Monitoring, etc. In addition, there are new verification technologies under development of START; i.e., unique identifiers or "tags" for legally produced and accountable missile stages. These "tags" would permit inspectors to distinguish between legal, overt elements of the force structure, and those that may be covertly produced and introduced into the force structure. Tag reading will occur during certain on-site inspections. Under DOE leadership, tagging technologies are being developed by Sandia, with the assistance of Los Alamos and Lawrence Livermore National Laboratories. This effort is being coordinated with the START interagency group and appropriate military services.

DOE is also sponsoring development of technologies to permit the counting of reentry vehicles on strategic missile systems. This work is being conducted at Los Alamos, Lawrence Livermore, and Sandia National Laboratories. This effort is also being coordinated with the appropriate military services.

DOE is actively participating in the development of START inspection protocol language. Pending final resolution of certain interagency deliberations and U.S./Soviet negotiations, DOE facilities may be subject to Suspect-Site inspections and/or Perimeter-Portal Monitoring. Consequently, DOE is examining its ability to meet its statutory obligations to protect sensitive national security information, processes, and equipment from inadvertent compromise while fulfilling its role in national defense and other programs.

DOE Long Range Arms Control Planning

In planning for a future in which nuclear weapons and warheads may be severely constrained, it is prudent for DOE to conduct research to develop possible methods to verify any agreed upon limits. Additionally, DOE is identifying alternative technologies that may meet national security needs. These activities are tied to the overall scope and intensity of arms control negotiations and will probably require increased funding levels in the future.

Senator Glenn. How much money has DOE requested for verification support for fiscal year 1989?

Secretary HERRINGTON. The total DOE support for verification and control technologies is $139.6 million for fiscal year 1989, of which $103.8 million will go directly for verification.

Senator GLENN. How does DOE coordinate its verification activity with DOD, ACDA, and other agencies?

Secretary HERRINGTON. START, INF, Defense and Space, and NTT each have interagency groups and backstopping committees that together serve as an ideal forum for identifying issues, reaching USG consensus, and exchanging information on major activities that may be underway in each agency. In support of national security objectives, DOE's Office of Arms Control actively participates in each of these fora on certain negotiating delegations and in bilateral and multilateral arms control organizations.

Senator GLENN. Could you please discuss the status of efforts to certify that the unratified Peaceful Nuclear Explosives Treaty (PNET) and Threshold Test Ban Treaty (TTBT) which would prohibit nuclear tests above 150 kilotons are effectively verifiable? Do you believe the Soviets have been complying with the 150 kiloton limit?

Secretary HERRINGTON. The President has determined that the TTBT and PNET, as written, are not effectively verifiable and has identified the right to conduct direct, on-site hydrodynamic measurement of the yield of any Soviet explosion which might appear by remote observation to have exceeded 150 kilotons as necessary to provide effective verification of these Treaties. The United States goal in the Nuclear Testing Talks currently underway in Geneva is to gain Soviet acceptance of these improved verification measures.

The President, in his 1987 report on Soviet TTBT compliance, determined that the Soviets were in likely violation.

Senator GLENN. Some have citicized the INF Treaty because the fissile material from the dismantled nuclear warhead devices can be retained. This issue is certain to be revived during consideration of the proposed START agreement. What are your views on negotiating a ban on the production of weapons-grade fissile material? Do you believe such a proposal could be verifiable?

Secretary HERRINGTON. Our research does not indicate that a ban on weapons-grade fissile material production in nuclear weapon states would serve U.S. security interests. This is mainly because such a ban would involve difficult and intrusive verification measures not likely to result in effective verifiability. [Deleted.]

Questions Submitted by Senator Timothy E. Wirth

PROBLEMS WITH THE AGING COMPLEX

Senator WIRTH. At several points in your testimony, you refer to "our increasingly fragile complex" or "the aging complex." We are all in agreement that our 30- to 40-year-old nuclear weapons production complex is in urgent need of repair and attention. In your opinion, are we operating facilities that have surpassed their normal, or safe, lifespans at peak or near peak capacity?

Secretary HERRINGTON. As you are aware, a number of the weapons facilities have been operating well beyond their original design life. In addition, some are operating at levels below their name plate capacities due to excessive downtimes and outages for maintenance. However, I do not wish to leave the impression that these facilities are not being operated in a safe and environmentally acceptable manner. When we use the term fragility, we mean an accumulation of problems associated with aging and technological obsolescence brought about by a backlog of needed capital investment and evolving safety and environmental standards, all of which increases the probability that at some point we will not be able to meet the DOD's production demands.

There remains a clear need to modernize the complex, including the rebuilding of some major new facilities. In the meantime, the Department expects to continue operations, but with an ever-increasing cost in dollars and manpower requirements associated with maintaining production and safety for these facilities.

Senator WIRTH. Where in the complex are the most acute problems of outdated facilities?

Secretary HERRINGTON. The most acute problems of outdated facilities are as follows:

Feed Materials Production Center (FMPC), Fernald, Ohio. This old facility was not upgraded during the 1970s due to its low utilization and impending shutdown at that time; however, an extensive modernization program is now underway.

Certain Plutonium Processing Facilities at Rocky Flats, Savannah River, and Richland involving primarily glovebox type operations for recovery and conversion of plutonium compounds to metal. In many cases, replacement projects are in various stages of planning, design, or construction.

To a lesser degree, certain aspects of the production reactors at Savannah River could be considered by some as outdated, such as use of a confinement system as opposed to a commercial reactor type of containment system; however, the characteristics of the Savannah River heavy water reactors, combined with the remote site result in confinement being an acceptable approach for this application. There has been and will continue to be a large upgrade program for these reactors due to the aging problems.

Senator WIRTH. What dangers to the workforce or public do you see if we continue to use these aging facilities without making the capital investments needed to modernize the complex?

Secretary HERRINGTON. As discussed above, the mere existence of an aging complex does not in itself pose an immediate danger to employees or the public. This is because the Department has taken extraordinary means to assure no facilities will be operated unless we can provide adequate safety and environmental assurances. However, without sufficient and sustained capital investment, it will be very difficult and costly to meet these assurances, and other areas such as productivity and output will be sacrificed.

ROCKY FLATS—POPULATION DENSITY

Senator WIRTH. As you well know, I have had a long relationship with the Rocky Flats plant in Colorado. When the plant was first built in Golden, Colorado, in the 1950s, it truly was a rural setting. Over the years, however, the population of Denver and its northern suburbs grew dramatically, and now hundreds of thousands of Coloradans live in close proximity to the plant. Do you agree that this is an undesirable—and, over the long-term, unacceptable—situation? Are these other DOE nuclear weapons production plants confronted by the same problem of metropolitan populations growing in close proximity?

Secretary HERRINGTON. Considering the growth of the Denver area, we would not locate the plant at its present site today. I cannot state at this time that the present location of the plant is an unacceptable situation for the long term. As we have advised you, we are studying the long term future of the Rocky Flats plant, and this is a very complex issue. We do have other weapons production plants located in populated areas. These plants do not present the same situation as the Rocky Flats plant since they do not handle large quantities of nuclear materials. While we are considering the future of the Rocky Flats plant, we are committed to its continued safe operation. Even if we should conclude that the Rocky Flats plant should be relocated, this will require a number of years to accomplish. As we have discussed, proceeding with the modification of Building 371 is an integral part of our effort to ensure safe operations until potential close out of plutonium operations. At the same time, proceeding with the Building 371 modification does not commit the DOE to an irrevocable decision to remain at Rocky Flats indefinitely.

COST OF ENVIRONMENTAL CLEANUP

Senator WIRTH. The Environmental Policy Institute, a Washington-based environmental organization, has charged that its analysis of DOE's fiscal year 1989 budget request suggests Rocky Flats is being shortchanged in environmental cleanup funds, in comparison to Oak Ridge ($34.8 million in cleanup funds), Savannah River ($42.6 million), and Hanford ($8.3 million). Earl Whiteman, DOE's manager at Rocky Flats, says that's not the case, that $32 million is being spent this year on RCRA and CERCLA projects at Rocky, but that the funds are drawn from a number of accounts. I have asked Mr. Whiteman for a breakout of proposed spending on cleanup. Why, if in fact DOE is diligently pursuing cleanup of the many contaminated sites at Rocky, is it not more clearly apparent in the budget? What accounts would that spending be listed in?

Secretary HERRINGTON. The DP Environmental Restoration (ER) Program is intended to provide funding for remediation of uncontrolled hazardous waste and hazardous substance releases at inactive sites on DP installations. As such, it is a corrective actions program. The Resource Conservation and Recovery Act (RCRA) addresses the management of hazardous waste, both for current operations and past activities. Thus, not all RCRA expenditures are for corrective action; they may also involve facility compliance and upgrade activities. The statement that $32 million is being spent in fiscal year 1988 at Rocky Flats Plant on RCRA and CERCLA projects included other RCRA activities not in the ER program scope, as well as those RCRA activities proper to the ER program scope and appropriate CERCLA activities. Therefore, the funding referred to is contained in both the ER program budget and the Production and Surveillance budget.

The Department is diligently pursuing remediation of its inactive waste sites within the defense complex, including the Rocky Flats Plant. The funding for cleanup activities for fiscal year 1988 and fiscal year 1989 were developed based on the knowledge of the requirements for remediation known at the time of formulation. These requirements continue to evolve as a result of interaction with the regulatory agencies during the time between budget formulation and the budget execution year. Typically, this has the effect of increasing the scope of activities and the resources needed to address remediation issues. The Department does not believe that any of its installations are being "short changed" in environmental cleanup funds. The Rocky Flats Plant cleanup is on schedule in accordance with the Compliance Agreement among the United States Environmental Protection Agency and the Department of Energy. However, based on our experience to date, in terms of our increasing understanding of the nature of our remediation needs and the evolving regulatory requirements, resource needs are expected to increase significantly as the cleanup program is fully implemented.

The ER Program was first approved by Congress in December 1987, for the fiscal year 1988 budget year, and we are therefore in the early stages of implementing this new management and budgeting structure for the DP complex. This process is ongoing and may result in the identification of activities and resource allocations planned for fiscal year 1988 and fiscal year 1989 for remediation activities that are not yet fully captured by the ER program. While our improved bookkeeping process is being emplaced, the monies for needed restoration activities at the Rocky Flats Plant are being spent and tracked.

BUILDING 371 RENOVATION

Senator WIRTH. The fiscal year 1989 budget request proposes the renovation of a plutonium processing building at Rocky Flats—known as Building 371—which was completed in 1981 at a cost of $235 million. Your proposal asks for an additional $370 million, beginning with $18 million next year, for the renovation. As you know, I am concerned about the wisdom of spending that level of taxpayer dollars at a site like Rocky Flats before DOE has completed its study of how the future complex will look. Why should not Congress insist that this funding decision be postponed until we have had an opportunity to review the 2010 study?

Secretary HERRINGTON. DOE has looked closely at the renovation of Building 371 at Rocky Flats, and has examined many alternatives to spending additional funds on this building. Renovation of 371 consistently appear to be the most cost effective and safest solution to the reprocessing need for the next 10 to 15 years. Should a decision be made in the future to move plutonium reprocessing from the Rocky Flats site, a facility such as Building 371 will be needed to decontaminate the equipment at Rocky Flats. The modernization study and other planning activities will not change the need for this facility at Rocky Flats. However, a delay in this facility's improvements will result in increased operations and maintenance costs and inevitable escalation in the ultimate cost of the project.

Senator WIRTH. Building 371 was intended to be a state-of-the-art plutonium processing facility that would replace two outdated buildings at the Rocky Flats Plant. When it was finished, however, the design and construction flaws were so serious the reprocessing system could not operate at 7 percent capacity. What steps would DOE take to ensure that the same mistakes were not repeated after spending the additional $370 million it has proposed?

Secretary HERRINGTON. DOE is aggressively applying the lessons learned from the prior Building 371 project to ensure that the planned modifications will result in a facility that meets its programmatic and functional mission requirements.

The planned project is being managed as a major system acquisition which elevates project oversight and key decisions within the DOE. A dedicated and disciplined management structure is in place to control and manage the project to the technical, cost and schedule objectives. This management structure includes a detailed work breakdown structure, use of critical path methodology, a cost schedule control system, and a dedicated project organization with responsibility for day to day project activities. There are also regular project reviews and periodic independent project assessments planned within DOE to assure adequate project oversight.

Secondly, the design approach for the planned project is based on independent, modular reprocessing systems. This contrasts with the large interdependent reprocessing systems design approach used in the original design, which resulted in poor reliability of continuous operations.

Further, the operational failure of the current Building 371 resulted from design and technology flaws, not construction flaws. As a result, the DOE initiated Plutonium Recovery Option Verification Exercise (PROVE). The objective of PROVE is to demonstrate a full scale prototype of the aqueous reprocessing technology in a realistic operational environment to optimize the design and also to test the management systems to be used in the full project.

These management and technology demonstrations will ensure that the lessons learned are incorporated into the full scale facility.

THE 2010 STUDY--FUTURE SCENARIOS

Senator WIRTH. In undertaking its modernization plan for the nuclear weapons complex, known as the "2010 study," does DOE plan to examine a number of future scenarios that could result in a reduction of our nuclear weapons stockpile, and accordingly, a reduction in production requirements? For example, how will the INF agreement affect DOE's production requirements and, by extension, the future make-up of the complex? Or a START agreement?

Secretary HERRINGTON. DOE is conducting a study to modernize the Nuclear Weapons Complex pursuant to Section 3132 of Public Law 100-180. In this study, DOE will examine several options for the long-term configuration of the Nuclear Weapons Complex in its efforts to optimize the size of the complex to be responsive to the force structure requirements obtained from the Department of Defense. Included among the options will be responses to modified force structures aligned with agreements reached in treaty negotiations with other countries.

Senator WIRTH. For example, if you were to factor into the 2010 study a START agreement yielding a 50 percent reduction in warheads and put more emphasis on recycling existing plutonium inventories (from retired warheads and residues from the production process), would there be a need to build a second new production reactor? In what other ways might the complex be affected under such a scenario?

Secretary HERRINGTON. The modernization report will include implementation plans to achieve a modernized complex with transition plans to adjust to changing world political agreements such as a possible reduction in the nuclear weapons stockpile and the associated requirements for special nuclear material. The number of new production reactors will be based on the results of the analysis and size and technology selected for the NPR in the current budget request.

FACTORS AFFECTING PRODUCTION GOALS

Senator WIRTH. In your testimony, you state that "because of budget constraints, there has been a significant reduction in the weapons to be built over the next several years, and that will allow us to conduct our program within these constraints." That raises the question: What are the factors involved in setting DOE's production goals? If you were to weigh those factors according to importance, how do budgetary constraints compare to other factors?

Secretary HERRINGTON. Basically, Department of Defense nuclear weapon requirements as approved by the President in the Annual Nuclear Weapons Stockpile Memorandum (NWSW) drive the demand for new production by the Department of Energy. The desire of the DOE is to produce the "required" weapons under safe and environmentally sound conditions. All of the Departments, however, under the budget summit agreement had to tighten their belts and accept substantive resource limitations not only for fiscal year 1989 but for the foreseeable future as well. In short, our management factors do not include budgetary constraints; we simply have to do the best that we can under the spirit of deficit reduction that includes reduced OMB targets across the 050 account. We have and will continue to work with DOD through the Nuclear Weapons Council to formulate a weapons production program that is acceptable from a national security perspective and is within our projected budget authority. If we cannot attain a balance, be assured that the Congress will be asked for additional resources.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

BUDGET ISSUES

Senator **THURMOND**. Secretary Herrington. This year, the DOD and DOE together arrived at the final budget figure, in part by adjusting requirements. How do you expect this process to work in the future when DOE's requirements associated with modernizing the complex will be even more demanding—for example the new production reactor—and adjustments to production requirements are not available or sufficient? In short, how do you propose DOE get a bigger share of a national defense account that may not enjoy much real growth in the foreseeable future?

Secretary **HERRINGTON**. Through the Nuclear Weapons Council, we would expect our Departments to jointly determine the need to increase our share of funding within the 050 account. We have documented our needs to assure our ability to meet DOD requirements and to maintain a viable capability. The Nuclear Weapons Council is the appropriate body to make the necessary tradeoffs to assure the DOE can continue to provide a viable complex to meet national security needs.

FERNALD PLANT

Senator **THURMOND**. Mr. Wade. Some weeks ago, there was an article on the Fernald plant that questioned the need for continued operation, since its principal purpose was to provide materials for the N Reactor. What is the relation of Fernald to the N Reactor, and should we consider closing Fernald in view of the N Reactor decision?

Secretary **HERRINGTON**. The Feed Materials Production Center (FMPC) at Fernald, Ohio, produced fuel element cores for the N Reactor. Remaining missions of the FMPC are to supply high quality uranium metal in various forms to support DOE reactor operations and other applications. These products include depleted uranium derbys to Y-12 and Rocky Flats; 4-inch billets to Rocky Flats; Mark 31 cores to Savannah River; and 2-inch billets to Rocky Flats. N Reactor production accounted for less than 25 percent of materials produced at the FMPC in fiscal year 1987 and planned for fiscal year 1988.

The impact of the N Reactor decision on FMPC operations is still being evaluated, as are alternatives to production at FMPC.

WIPP ROADS

Senator **THURMOND**. Mr. Wade. I understand that there are funds in this budget to build roads associated with the Waste Isolation Pilot Plant (WIPP) project. How do you justify this request in terms of the national security budget function?

Secretary **HERRINGTON**. The requested funds are necessary to complete repairs and maintenance required for certain roads in New Mexico over which waste destined for WIPP will travel. The Department has supported the State of New Mexico in the need for this road work to help ensure the safe transport of the waste to WIPP. Although it may not be a direct WIPP responsibility, the existence of safe roads for waste transport in New Mexico will have a profound and positive effect on the mission of WIPP to demonstrate the safe transportation and disposal of radioactive waste.

RESIDUE RECOVERY—NUCLEAR MATERIALS REQUIREMENTS

Senator **THURMOND**. Mr. Wade. Could you describe for the committee your near-term contingency plan "to accelerate the processing of plutonium residues to provide the necessary material should it be required?"

Secretary **HERRINGTON**. DOE is continuing to evaluate the capability for processing plutonium at four Defense Program plutonium processing sites. These sites are the Los Alamos National Laboratory (LANL) at Los Alamos, New Mexico; the Rocky Flats Plant (RFP), near Denver, Colorado; the Savannah River Plant (SRP) at Aiken, South Carolina; and the Hanford site, near Richland, Washington. These four sites are operated as an integrated complex.

Our approach is to use our existing capability more fully, rather than to increase our capability. Toward this end, DOE is preparing to reprogram funding at SRP for operation of the new special recovery facility and the HB Line, Phase II, for scrap processing. We plan to operate the plutonium reclamation facility for unrestricted scrap processing at Hanford and we are currently studying the accelerated transfer of candidate materials for processing. We are increasing the resources at RFP for scrap processing, and we are proceeding with the replacement facilities for existing scrap processing facilities. We are continuing to utilize capability at LANL for scrap processing, while increasing our scrap recovery process development.

Technology from process development is provided to all scrap processing sites to increase capability.

STRATEGIC DEFENSE INITIATIVE

Senator THURMOND. Mr. Wade. Has the program for nuclear directed energy concepts been adjusted to account for delays in the overall SDI program necessitated by budget cuts?

Secretary HERRINGTON. Yes, the Department of Energy's (DOE) nuclear directed energy weapons (NDEW) research program on threat assessment has been adjusted because of declining budgets over the last several years. Work on several concepts has been suspended in order to maintain viable research on what we consider to be the stronger, more realistic threats. Diminishing NDEW funding resources (reduction of the order to 10–20 percent per year) also have affected the timetable of threat assessments initially established in 1984–85. Although the scope and nature of research on the selected concepts remain rather constant, milestones and schedules have slipped because of declining funds, which have reduced laboratory efforts in areas such as testing, diagnostics, and computer modeling. The end effect is that DOE NDEW threat assessment results initially scheduled for presentation to the Strategic Defense Initiative Organization in the early 1990s are not expected to be available until the [deleted].

ENRICHED URANIUM REQUIREMENTS

Senator THURMOND. What is your understanding of Admiral McKee's requirement for enriched uranium—why the increase in the request for this purpose?

Secretary HERRINGTON. The amount of enriched material requested by Admiral McKee to support fiscal year 1989 Naval Nuclear Propulsion requirements is lower than the fiscal year 1988 level. However, the dollar amount has increased due to a higher price for enrichment services as established by the Office of Uranium Enrichment.

FUNDING LEVELS

Senator THURMOND. Mr. Wade. What are the future funding implications of the Memorandum of Understanding currently under development with the Office of Civilian Radioactive Waste Management?

Secretary HERRINGTON. The purpose of the Memorandum of Understanding (MOU) is to establish an understanding between the Assistant Secretary of Defense Programs and the Office of Civilian Radioactive Waste Management on issues related to the disposal in geologic repositories of defense high-level waste. Primary issues include the amount of fees and the payment schedule. These will be addressed in the MOU. The future funding implication of this MOU for Defense Programs would include the amount and timing of requests for annual appropriations to be paid into the nuclear waste fund for Defense High Level Waste disposal services.

Senator THURMOND. In your judgment, has the level of funding required for safeguards and security leveled out?

Secretary HERRINGTON. In an examination of safeguards and security spending throughout the Department in recent years, it is clear that the level of funding for this crosscut type of activity has leveled off. In "as spent" dollars, since fiscal year 1985 all 1-year increases have been less than 10 percent. In fact, adjusting for inflation, real growth over this period has been negligible.

Senator THURMOND. Mr. Wade. You note in your testimony that the Production Assurance/Environmental, Safety, and Health funding level increased 40 percent from fiscal year 1988 to fiscal year 1989. Is this indicative of future funding growth in this area, and how does the Department intend to manage such increased requirements given the need to revitalize the complex?

Secretary HERRINGTON. For fiscal year 1989, Defense Programs (DP) estimates $1.02 billion for Production Assurance/Environmental, Safety, and Health (PA/ES&H) activities. This represents a $279 million increase (38 percent) in the budget cross-cut estimate over fiscal year 1988. The majority of this increase is likely due to larger PA/ES&H Operating Expenses necessitated by the age of the complex, the Department's increased emphasis on environmental compliance, and our response to the safety-related findings of recent internal and external reviews of DOE nuclear facilities. Projections for the future indicate that ES&H compliance costs of current operations will level off as we update the nuclear materials production complex. We feel that improved environmental compliance and safety at our facilities is part of the process of revitalizing the complex and will help to assure, rather than detract from, continued production in the long run.

One compliance area, that related to the cleanup of environmental contamination at inactive waste sites and funded under the Environmental Restoration line of the budget, will be subject to continued growth. Applicable statutes prescribe timetables or so-called "hammer dates" for remediation measures, and in most cases our current operations are subject to hazardous waste permitting by State or Federal regulators that can attach cleanup provisions to the permit requirements. As the question suggests, it will be difficult to satisfy the compliance requirements within anticipated funding constraints. We will see that whatever resources the Congress appropriates to Environmental Restoration are efficiently applied to the most pressing situations.

NUCLEAR MATERIALS REQUIREMENTS

Senator THURMOND. I understand that Poseidon retirements contributed substantially to relieving the plutonium shortfall and thus to the decision to shut down the N Reactor. Are there other systems which have been retired from operation that have not yet been mined for their nuclear material?

Secretary HERRINGTON. The projected Poseidon retirements based on retirements of the warheads at the end of the boats' 30-year life have contributed substantially to changing plutonium requirements. This material projection was based on the warheads being returned on the following schedule: one boat in fiscal year 1988, one in fiscal year 1989, [deleted]. Material calculations are based on our standard procedure whereby materials are recovered as soon as possible after the retirement of a warhead. Other warhead systems are retired from the stockpile each year that are at various stages of material recovery.

QUESTIONS SUBMITTED BY SENATOR STEVEN D. SYMMS

NUCLEAR MATERIALS REQUIREMENTS

Senator SYMMS. Please explain what role, if any, the Special Isotope Separation (SIS) project will play in meeting the Nation's plutonium requirements.

Secretary HERRINGTON. The SIS production capability will provide a prudent level of flexibility, technological diversity, and contingency in the production of plutonium for defense applications. Unlike other methods or producing new weapon-grade plutonium, the SIS process provides a reactor-independent source of this material. It will provide needed contingency against either shutdowns or cutbacks in the existing complex, or an increase in the demand for weapon-grade plutonium.

Senator SYMMS. Have the tritium requirements changed significantly over the past year?

Secretary HERRINGTON. The tritium requirements have not changed significantly over the past year. The major portion of tritium requirements supports decay replacement in existing weapons. Therefore, from year to year there are usually no significant changes in tritium requirements.

NEW PRODUCTION REACTOR(S)

Senator SYMMS. Mr. Herrington, are you familiar with the language in the DOD Authorization Act for 1988–89 and the legislation in the Continuing Resolution for fiscal year 1988 that specifically directs DOE to study a two-reactor approach for nuclear material production capacity?

Secretary HERRINGTON. I am familiar with the congressional language directing DOE to study a two-reactor approach for nuclear materials production capacity.

Senator SYMMS. Please tell us what actions DOE is taking to seriously address this congressional mandate.

Secretary HERRINGTON. An assessment of candidate technologies for one or more new production reactors is being undertaken by the Department's Energy Research Advisory Board. The reactor technologies being reviewed include: (1) low-temperature heavy water reactor; (2) light water reactor (WNP-1 and special design production reactors); (3) high-temperature gas-cooled reactor; and (4) liquid metal reactor. Each candidate technology will be evaluated with regard to the primary mission of providing an assured supply of tritium to sustain our nuclear weapons stockpile while not posing an undue risk to the health and safety of the public and the plant workers. Conversion to plutonium production will also be evaluated.

I have specifically requested that the Energy Research Advisory Board evaluate the concept of duality; i.e., to have redundancy and diversity of reactor technologies at one or more sites to produce weapon materials. Also, multiple units of a single technology at a single site will be considered where the aggregate output exceeds tritium goal amounts; e.g., three units sized at 50 percent of goal. Capacity flexibility, such as the reactor flexibility to produce 125 percent of goal quantities of tritium, without encountering significant risk to the timely completion of assured production will also be addressed.

Senator SYMMS. As I stated earlier, two reactors do not necessarily imply twice the capacity but suggests smaller, incremental capacity. Has DOE evaluated the benefits of modular—say 200 to 300 megawatt units—for replacement production reactors?

Secretary HERRINGTON. The benefits of modular reactor concepts are being evaluated. As part of the assessment of candidate technologies for the new production reactor(s) by the Department's Energy Research Advisory Board (ERAB), the Department will review the ERAB findings and advise Congress of the Department's recommendation in the final new production reactor report to Congress in July 1988.

Senator SYMMS. Wouldn't two modular-type reactors allow DOE to build at more than one site, mitigating the political problems of having to select a single winner in the site-selection process?

Secretary HERRINGTON. The potential advantages of having multiple units of a single technology at two or more sites, where the aggregate output meets or exceeds tritium goal quantities, are being considered by the Energy Research Advisory Board. The Department will review the ERAB findings and advise Congress of the Department's recommendation in the final new production reactor report to Congress in July 1988.

Senator SYMMS. Has DOE addressed the national security concern of "having all our eggs in one basket"—all production at one facility?

Secretary HERRINGTON. Yes. Diversity of sites for production reactors offers some advantages in assuring a secure source of tritium. These advantages are being carefully considered by the Department as we formulate an acquisition strategy for new production reactor capacity. The Department's recommendation on this issue will be presented in the final report to Congress in the July 1988 timeframe.

Senator SYMMS. Isn't it likely that modular construction at one or more sites would allow DOE to tailor the material requirements to ever-tightening construction, schedules, and budgetary constraints, especially in light of the constantly changing nuclear stockpile requirements.

Secretary HERRINGTON. The modular reactor designs appear to offer potential benefits in the areas of production flexibility and redundancy. These benefits will be carefully considered by the Department's Energy Research Advisory Board and the Energy Systems Acquisition Board. A recommendation will be provided in the final report to Congress in July 1988.

Senator SYMMS. What priority has DOE given safety in determining what type of reactor will be built for the NPR? Has it determined which of the candidate technologies offer the greatest margins of safety?

Secretary HERRINGTON. The Department has asked the Energy Research Advisory Board (ERAB) to review alternative reactor technologies and to report its findings to the Department. As a part of this review, the ERAB will assess the safety of each candidate technology.

Senator SYMMS. Has DOE determined if the new production reactors will have to be "licensable" if not licensed by NRC?

Secretary HERRINGTON. The Department is committed to assuring that its defense reactors provide a level of safety comparable to, or exceeding, that provided for commercial nuclear power plants. To assure this, the Advisory Committee on Nuclear Facility Safety has been established to oversee the Department's commitment to safety. This committee will report directly to the Secretary of Energy on the status of the safety activities. It is not anticipated that the New Production Reactor would be licensed by the Nuclear Regulatory Commission.

Senator SYMMS. Have any reactors of the Heavy Water type undergone licensing review by the NRC or other private agency? Are basic codes and other test data available to perform safety analysis on the Heavy Water reactors? When was the last Heavy Water reactor designed and built in the United States?

Secretary HERRINGTON. The Nuclear Regulatory Commission evaluated the licensability of CANDU-type heavy reactors in the United States (Reference: NUREG/CR-113, "Licensability of CANDU-Type Reactors in the United States," August 1980).

In addition, the SRP HWRs were reviewed by the AEC Regulatory Staff and the ACRS until 1974 when ERDA, and subsequently DOE, was formed. Basic codes are available and have been used in previous safety analyses on HWRs. The DOE is currently upgrading the codes and analyses to reflect analytical techniques representative of contemporary safety standards. The SRP HWRs were designed and built in the early 1950s and have been upgraded over the last 30 years to enhance safety and reliability.

Senator SYMMS. The cost of an NPR(s) and the upgrading required of the old support facilities or building of new ones will be several billion dollars. I would hope DOE would give major consideration to the life cycle operating costs of these facilities including the revenues that could be derived from energy sales. I have been told sale of energy from an NPR(s) can be significant—$250 million or more. Given this, are there concerns that would lead DOE to not select a technology that has the capability to co-produce nuclear materials and steam for electricity?

Secretary HERRINGTON. Certainly the life cycle operating cost for a production reactor would be reduced by the revenues derived from steam or electricity sales. Such savings will be carefully considered by the Department in its evaluation of candidate technologies along with other factors such as tritium production, assurance, experience base, and deployment schedule. All technology evaluation criteria will be assessed by the Department's Energy Research Advisory Board and the Energy Systems Acquisition Advisory Board. The Department will document its assessment in the final report to Congress in July 1988.

Senator EXON. We are adjourned.

[Whereupon, at 11:02 p.m., the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

TUESDAY, APRIL 12, 1988

U.S. Senate,
Subcommittee on Strategic Forces
and Nuclear Deterrence,
Committee on Armed Services,
Washington, DC.

CHEMICAL WEAPONS MODERNIZATION AND DEMILITARIZATION PROGRAM

The subcommittee met in executive session, pursuant to notice, at 9:06 a.m., in room SR-222, Russell Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Glenn, and Thurmond.

Staff present: Robert E. Bayer, Robert F. Bott, Brian D. Dailey, Colleen Getz, William E. Hoehn, Jr., and Ronald P. Kelly, professional staff members; Mickie Jan Wise, staff assistant.

Also present; Jeffrey B. Subko, assistant to Senator Exon; Gregory J. Weaver, assistant to Senator Levin; Milton D. Beach, assistant to Senator Glenn; and Karl H. Stegenga, assistant to Senator Quayle.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator Exon. The subcommittee will please come to order.

Before we begin this morning, I want to make certain that the room is properly cleared. I would ask that the Defense Department officials who are here cooperate at this time, while I am reading my opening statement, to make certain that the room is properly cleared, because, as you know, this is a highly classified subject that we are about to cover.

I would also direct the staff at this time to work with Department of Defense officials to make sure that we are properly cleared.

This morning the Subcommittee on Strategic Forces and Nuclear Deterrence meets to review the U.S. chemical modernization program and the U.S. chemical demilitarization program—the disposal of the aging unitary chemical weapons stockpile.

The development of a modern chemical deterrent is an essential element of the United States and NATO's deterrent strategy. Equally important in deterring the use of chemical weapons are defensive measures, both equipment and techniques for use by our forces in the field.

While creating an effective deterrent to Soviet use of chemical weapons remains a major goal of the U.S. chemical modernization programs, the use of chemical weapons in the Iran-Iraq war and the proliferation of chemical weapons to more than 20 countries demonstrates the even greater importance right now attached to possessing a modern chemical deterrent.

The United States must continue vigorously to pursue an effective chemical deterrent modernization program.

The Senate is going to fight very hard for this measure and I believe that, if anything else has been demonstrated by the Iran-Iraq War, it is that the general feeling that this is something we do not have to worry about in the future has shocked many of those who probably did not understand the importance of this deterrent program back into a sense of reality.

And from that standpoint and from that standpoint only, I would simply like to say that at least that part of the Iran-Iraq conflict may be of some benefit to us as we try our strategies for the future.

This morning this subcommittee welcomes Dr. Thomas Welch, Deputy to the Assistant to the Secretary of Defense for Atomic Energy, who will review the status of the chemical weapons modernization programs.

Joining him are Capt. Larry Pfitzenmaier—and I hope I have pronounced that right.

Captain PFITZENMAIER. Very close.

Senator EXON. How do you say it?

Captain PFITZENMAIER. "Fit-zen-my-er."

Senator EXON. Okay. I take it that might be a German name, is that right?

Captain PFITZENMAIER. Yes, sir.

Senator EXON. We will have Larry Pfitzenmaier, program manager for the Bigeye chemical bomb.

Also, Col. Robert Orton, program manager for binary weapons; and Dr. Dee Ritchie from the Directorate of Operational Test and Evaluation, who will address the specific questions we have about the Bigeye.

This portion of the hearing will in closed session at the "top secret" level, and when we turn our attention to the chemical demilitarization program later, we will move into open session.

For the second half of the hearing, we will welcome Dr. John Shannon, Assistant Secretary of the Army for Installations and Logistics, and Brig. Gen. David Nydam, program manager for the chemical demilitarization, who will address the Department of Defense's recent decision to dispose of the existing unitary chemical stockpile by means of on-site destruction.

With that, before I call upon our first witness, do I have notice that the room has been properly cleared?

Mr. HOEHN. Yes, sir.

Dr. WELCH. Yes, Mr. Chairman.

Senator EXON. Well, I am pleased that the room has been properly cleared, and I am happy to recognize you at this time, Dr. Welch.

STATEMENT OF DR. THOMAS WELCH, DEPUTY TO THE ASSISTANT TO THE SECRETARY OF DEFENSE FOR ATOMIC ENERGY, ACCOMPANIED BY COL. ROBERT ORTON, U.S. ARMY, PROGRAM MANAGER, BINARY WEAPONS; CAPT. LARRY PFITZENMAIER, U.S. NAVY, PROGRAM MANAGER, BIGEYE CHEMICAL BOMB; AND DR. DEE RITCHIE, DIRECTORATE OF OPERATIONAL TEST AND EVALUATION

Dr. WELCH. Thank you very much, Mr. Chairman, and thank you for that very supportive and helpful opening statement. Your subcommittee has had a great deal to do with the success story of restoring chemical deterrence for the United States and I want to thank you for that.

With your permission, Mr. Chairman, I will submit a statement for the record.

Senator EXON. Without objection, it will be accepted in its entirety.

Dr. WELCH. Thank you.

Mr. Chairman, Chairman Nunn, Secretary Carlucci, and others have stated the need for this subcommittee and for others within the Senate Armed Services Committee to focus on broad policy issues, even at the expenses of some of the details of the budget functions of acquisition.

I would like to respond to that challenge and increase the dialogue that we had developed in the past on these policy issues in the chemical area. To begin with, any policy has to start with what our national policy is on chemical warfare. It remains very much the same as in the past, and that is that we will do everything necessary to prevent the use of chemical weapons, biological weapons, or toxin weapons against the men and women in our Armed Forces.

That is the starting point, and that of course is our national policy of long standing. Now, how do we go about pursuing this policy and achieving the goals that are implied in it?

As you mentioned, we are going to pursue arms control in a very rigorous fashion. We see the necessity—and I would like to underline the word "necessity"—for a worldwide comprehensive global ban on the possession of chemical weapons.

Concomitant with this arms control initiative, we must make sure that those who would consider use of chemical weapons against our men and women in uniform are deterred against such use by maintenance of a defensive capability and a small but adequate retaliatory capability.

Now, on the defensive side, this means materiel such as masks, overgarments, and detectors and so on. These are necessary, but not sufficient. We know from a number of tests, from a number of experiences, that defense is not sufficient.

It is not sufficient because of the debilitation that comes with use of this equipment. We simply cannot afford the loss in time and the loss in efficiency that comes with wearing masks, overgarments, gloves, and so on, For this reason, we must maintain a small but adequate retaliatory capability.

Over the past few years, we have made clear to this subcommittee that we no longer possess a credible retaliatory capability, and it is for this reason that we have sought and the Congress has supported the need for binary chemical munitions.

Second, our policy must acknowledge the fact and take account of the fact that we are dealing with a worldwide chemical threat. As you mentioned, in the Iran-Iraq War chemical weapons are being used today.

We have brought along a few viewgraphs to illustrate this point. These were taken some time ago and make clear that, although these casualties occurred a number of years ago, this Iran-Iraq War has been a chemical war now for a number of years.

Chemical casualties have been acknowledged by the United Nations and other independent people looking at that war.

Chemical weapons use has been confirmed. We are talking about tons and tons of chemical agents. It is not a small part of the battlefield. It is a very important part of the battlefield over there.

From a broad policy point of view——

Senator EXON. For clarification, these pictures that we are seeing, could give us information about them?

Dr. WELCH. These are Iranian soldiers. They are victims of an Iraqi chemical attack. The agent used in this case was mustard, a World War I agent, but still a very high producer of casualties.

We are counting thousands and thousands of casualties in that war due to chemical weapons. It reflects the technical point that any nation with a chemical industry, such as a fertilizer industry, can make chemical weapons. They are not that difficult to make.

Iran and Iraq are just two of the nations with chemical weapons. Others include, of course, the Soviet Union, [deleted] as well as others.

When we stopped producing chemical weapons in 1969, we knew of about half a dozen nations with chemical weapons. Today as we begin to rebuild our stockpile, the list is up around 20.

So how do we handle this worldwide threat? What should our policy be? Well, certainly it would be a mistake to optimize our defense and our deterrent capability vis-a-vis just one nation, for example the Soviet Union. We need to take account of the fact that many nations, for example those in the Middle East, represent a chemical threat to the United States.

We have interests there, we have allies there. We have plans to commit forces there under certain circumstances, and there is a real chemical threat in that region.

It is for this reason that retaliatory systems such as the Bigeye bomb are so important, because that is the weapon that we would use to deter first use in these areas. That is the weapon that would ride on aircraft carriers and be delivered by aircraft of the Navy, Air Force, and Marine Corps.

The third thing I would like to emphasize about broad statements of policy is that there is a qualitative change under way in the chemical warfare business. Its leader is the Soviet Union.

The qualitative change that is taking place is the arrival of new chemical-biological warfare agents. Nerve agents are considered by many to be the state of the art agent of use for chemical wars. But nerve agents are more than 50 years old now.

In that period, we have seen great strides made on the civilian side of the chemical industry, and lately we have seen great changes, advances made in what is called biotechnology.

We have seen in this country the arrival of illegal drugs, the so-called designer drugs, where chemists are able to get around the law by designing a drug to be sold on the streets that is only slightly different from a well-know conventional drug, but which has pretty much the same effect.

The same kind of thing is possible in the chemical agent business, the chemical warfare business. This poses unique problems for us because our defensive equipment is designed against known agents.

If we see an adversary introduce new unknown agents, we have got some real problems. It is for this reason that we must, to first order, get ourselves a retaliatory capability for deterrence.

But second, we must take a relook at our defensive materiel, our defensive doctrine and training, to cope with the arrival of these new agents.

The last policy area I would like to address is this. This subcommittee is responsible for the acquisition, and many other related decisions regarding acquisition, in the defensive area. I would like to remind the committee that chemical weapons get into all of these areas.

All of the decisions you make regarding procurement should reflect the fact that they may be used, they may have to be used under conditions of chemical warfare. It is very difficult to operate many systems with the gloves, masks, overgarments, and so on that we need to survive.

In addition, some of these items that we procure are very difficult to clean up or to decontaminate after they have been attacked with chemical weapons. Indeed, some of the systems will actually absorb agents, chemical warfare agents, and present a hazard, a lethal hazard, for days, even weeks.

To this end, DOD has published a directive requiring the services to make all materiel survivable in a nuclear, biological, and chemical environment. I would ask for and solicit your help in helping us achieving the goal of making all materiel NBC survivable.

The last thing I would like to say is that the most important thing in our policy considerations must be a focus on the deterrent value of what we are doing. We are not setting out to get into the war-fighting business. We will not maintain a biological weapons stockpile. We are out of the biological business altogether. We are not spending a penny on that.

We are, however, going to have to face up and continue to face up to the fact that we do need a chemical retaliatory capability if we intend to keep adversaries from using chemical weapons against the men and women in uniform.

Again, the object of our business is deterrence. We will never be the first to use chemical weapons. We will respect our signature to the convention prohibiting first use.

But at the same time, we owe it to the soldier to maintain a stockpile that is adequate, a defense that is adequate to cause anybody who wants to use chemical weapons against us to think twice.

Again, Mr. Chairman, I very much thank you for your opening statement, which was most supportive and right on target.

I have been accompanied this morning by representatives of the Army and Navy, whom you have introduced. Colonel Orton is the program manager for binary chemical munitions and can respond to programmatic questions. Larry Pfitzenmaier is program manager for the Bigeye chemical weapon and he can respond to those questions.

Independent from the OSD acquisition business is Dr. Dee Ritchie, whom you have introduced, in the Office of Operational Test and Evaluation, an office which has been very much involved in the Bigeye testing, and can give you an independent point of view regarding the Bigeye test plan and the Bigeye test results.

And finally, Mr. Shannon will join us later when we go into open session.

I will be very pleased, Mr. Chairman, to respond to any questions you have now about broad policy issues. If you have programmatic questions, I will be very pleased to respond or to call on some of my colleagues at the table.

[The prepared statement of Dr. Welch follows:]

STATEMENT BY

DR. THOMAS J. WELCH

DEPUTY ASSISTANT TO THE SECRETARY OF DEFENSE

(ATOMIC ENERGY) (CHEMICAL MATTERS)

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I THANK YOU FOR THIS OPPORTUNITY TO PROVIDE THE COMMITTEE WITH A DISCUSSION OF OUR CHEMICAL WARFARE AND CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM. THE FORESIGHT DISPLAYED BY CONGRESS IN THE APPROVAL OF PAST CHEMICAL AND BIOLOGICAL DEFENSE PROGRAMS HAVE BROUGHT US TO THE POINT TODAY WHERE SERVICES ARE ACHIEVING SIGNIFICANT RESULTS. ON BEHALF OF THE SOLDIERS, SAILORS AND AIRMEN WHO WOULD BEAR THE BRUNT OF A CHEMICAL ATTACK, THANK YOU. I HAVE A PREPARED STATEMENT WHICH I WOULD LIKE TO SUBMIT FOR THE RECORD.

PROGRAM OBJECTIVES

THE NATIONAL SECURITY OBJECTIVE OF THE DEPARTMENT OF DEFENSE CHEMICAL WARFARE AND CHEMICAL-BIOLOGICAL DEFENSE PROGRAM IS TO PREVENT THE USE OF CHEMICALS, TOXINS AND BIOLOGICAL AGENTS AGAINST MEMBERS OF THE UNITED STATES ARMED FORCES. THE UNITED STATES WILL NOT INITIATE THE USE OF

CHEMICAL WEAPONS. THE UNITED STATES DOES NOT AND WILL NOT POSSESS BIOLOGICAL WARFARE WEAPONS. OUR CHEMICAL WARFARE EFFORTS ARE DIRECTED AT DETERRENCE. DENYING AN ADVANTAGE TO THE INITIATOR OF CHEMICAL WARFARE REQUIRES AN EFFECTIVE CHEMICAL DEFENSE POSTURE AND A MEANS TO RETALIATE. A CREDIBLE DETERRENT MUST ALLOW RETALIATION ACROSS THE FULL DEPTH OF THE BATTLEFIELD WITH CHEMICAL AGENTS APPROPRIATE TO THE OPERATIONAL NEED. TO THE EXTENT THAT OUR EFFORTS DENY OUR ADVERSARIES A MILITARY ADVANTAGE, THOSE EFFORTS CONTRIBUTE TO OUR ARMS CONTROL GOALS ON CHEMICAL WEAPONS.

IN PROVIDING THE PROPER FOUNDATION AND CONTROL IN MEETING UNITED STATES POLICY OBJECTIVES, THE OFFICE OF THE SECRETARY OF DEFENSE HAS TAKEN A NUMBER OF RECENT INITIATIVES. FOR EXAMPLE, WE PUBLISHED A DEPARTMENT OF DEFENSE DIRECTIVE ON JULY 23, 1987 PROVIDING CHEMICAL WEAPONS POLICY GUIDANCE TO THE SERVICES. A DEPARTMENT OF DEFENSE INSTRUCTION WAS PUBLISHED JUNE 15, 1987 REQUIRING THE SERVICES TO INSURE NUCLEAR, BIOLOGICAL AND CHEMICAL CONTAMINATION SURVIVABILITY OF NEW EQUIPMENT. OUR CHEMICAL STUDIES PROGRAM HAS YIELDED TIMELY, ALTHOUGH SOMEWHAT DISTURBING INFORMATION CONCERNING THE GROWING CHEMICAL AND BIOLOGICAL THREAT CAPABILITY OF THE SOVIET UNION

AND AN INCREASING NUMBER OF THIRD WORLD COUNTRIES. WHEN THE UNITED STATES STOPPED CHEMICAL WEAPONS PRODUCTION IN 1969, THERE WERE SIX COUNTRIES WITH A CHEMICAL WARFARE CAPABILITY. AS WE START CHEMICAL WEAPONS PRODUCTION TODAY IT IS ESTIMATED THAT OVER 20 COUNTRIES HAVE AN OFFENSIVE CHEMICAL WARFARE CAPABILITY. THIS, TOGETHER WITH THE ADVANCES IN THE THREAT TECHNOLOGY, INCREASE THE LIKELIHOOD THAT THE UNITED STATES FORCES WILL ENCOUNTER BIOCHEMICAL THREAT AGENTS OTHER THAN THOSE TRADITIONAL THREAT SUBSTANCES FOR WHICH OUR EQUIPMENT AND DOCTRINE HAVE BEEN DEVELOPED. IN CONSIDERATION OF THIS, THE DEPARTMENT ISSUED OVERALL DEFENSE GUIDANCE, AND MY OFFICE ISSUED A CHEMICAL AND BIOLOGICAL RESEARCH, DEVELOPMENT AND ACQUISITION WHITE PAPER, THAT DIRECTED THE REQUIRED CHANGES TO OUR EFFORTS IN SUPPORT OF THE OVERALL NATIONAL SECURITY OBJECTIVES.

I HAVE BEEN ACCOMPANIED BY REPRESENTATIVES OF THE ARMY AND NAVY WHO WILL ANSWER ANY QUESTIONS YOU MIGHT HAVE ON THE DETAILS IN THEIR AREAS OF RESPONSIBILITY. THESE WITNESSES ARE: ARMY COLONEL ROBERT ORTON, PROGRAM MANAGER FOR BINARY CHEMICAL MUNITIONS; NAVY CAPTAIN LARRY PFITZENMAIER, PROGRAM MANAGER FOR THE BIGEYE CHEMICAL WEAPON; AND MR. JOHN W. SHANNON, ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS AND LOGISTICS), WHO WILL

MAKE A BRIEF STATEMENT ON THE ARMY'S CHEMICAL DESTRUCTION PROGRAM. ACCOMPANYING HIM IS ARMY BRIGADIER GENERAL DAVID A. NYDAM, PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION.

WE ARE REALIZING THE PRINCIPAL OBJECTIVE OF PREVENTING CHEMICAL AND BIOLOGICAL WARFARE THROUGH A CREDIBLE CHEMICAL RETALIATORY CAPABILITY AND A DEMONSTRATED STRONG DEFENSE POSTURE. OUR PROCUREMENT EFFORT IN THE AREA OF DEFENSE IS BRINGING US CLOSER TO OUR GOAL OF IMPROVING OUR ABILITY TO SURVIVE AND FIGHT IN A CHEMICAL AND BIOLOGICAL WARFARE ENVIRONMENT. ITEMS FOR INDIVIDUAL PROTECTION (SUCH AS MASKS, BOOTS, GLOVES AND UNIFORMS THAT ARE COMPATIBLE WITH TODAY'S COMBAT EQUIPMENT) ARE REACHING DEVELOPMENTAL MATURITY AND ENTERING PRODUCTION. MEDICAL INVESTIGATIONS INCLUDE PRETREATMENTS, ANTIDOTES AND VACCINES WHICH WORK AGAINST A BROAD SPECTRUM OF THREAT CHEMICAL AND BIOLOGICAL AGENTS. WE ARE PROCURING DETECTORS THAT IMPROVE THE IDENTIFICATION OF CONTAMINATED AREAS AND EQUIPMENT, THEREBY LOWERING THE RISK TO COMBAT PERSONNEL AND PERMITTING EQUIPMENT CONTAMINATION AVOIDANCE.

NEW THREAT CHEMICAL AND BIOLOGICAL AGENTS CAN BE GENERATED THROUGH RAPID ADVANCEMENTS IN BIOTECHNOLOGY. THIS PERMITS THE EXISTENCE OF A SPECTRUM OF THREAT AGENTS NOT PREVIOUSLY THOUGHT

POSSIBLE A SHORT TIME AGO. OUR PROGRAM IN THIS AREA SEEKS TO AVOID TECHNOLOGICAL SURPRISE. AGAIN, I EMPHASIZE THAT THE US DOES NOT AND WILL NOT POSSESS BIOLOGICAL WEAPONS.

THE CHEMICAL WARFARE AND CHEMICAL BIOLOGICAL DEFENSE PROGRAMS IN SUPPORT OF THE US POLICY ARE DIVIDED INTO THREE CATEGORIES: DEFENSE, RETALIATORY AND DESTRUCTION. I WILL DISCUSS EACH BRIEFLY.

DEFENSIVE PROGRAM

CHEMICAL AND BIOLOGICAL DEFENSE PROGRAMS FUNDED OVER THE PAST FEW YEARS ARE BEGINNING TO YIELD SUBSTANTIAL IMPROVEMENTS IN THE OVERALL CHEMICAL DEFENSE POSTURE OF THE SERVICES. ONE IS THE DEVELOPMENT AND INITIAL FIELDING OF IMPROVED CHEMICAL PROTECTIVE MASKS. THOSE FORCES SUBJECT TO CHEMICAL, TOXIN OR BIOLOGICAL WEAPONS ATTACKS MUST HAVE THE MEANS TO SURVIVE AND SUSTAIN OPERATIONS. THE MOST IMPORTANT PIECE OF INDIVIDUAL PROTECTION EQUIPMENT IS THE MASK. THERE IS A HIGH PRIORITY EFFORT BY ALL SERVICES TO UPGRADE THEIR EQUIPMENT IN THIS VITAL AREA. THE MASKS NOW IN PRODUCTION HAVE SIGNIFICANTLY INCREASED LEVELS OF PROTECTION AND ARE ALSO COMPATIBLE WITH TODAY'S HIGH TECHNOLOGY EQUIPMENT. THE ARMY'S AVIATOR MASK, WHICH ENTERED PRODUCTION THIS PAST YEAR IS THE ONLY CHEMICAL PROTECTIVE MASK

THAT IS COMPATIBLE WITH THE INTEGRATED HELMET AND DISPLAY SIGHTING SYSTEM WORN BY THE VITALLY IMPORTANT APACHE ATTACK HELICOPTER AVIATORS. THE AIR FORCE AND THE NAVY ARE ALSO PURCHASING THE IMPROVED CHEMICAL PROTECTIVE MASKS FOR GROUND SUPPORT PERSONNEL. THE ARMY IS CONTINUING THE PURCHASE OF MASKS WHICH AFFORD SIGNIFICANTLY IMPROVED PROTECTION TO THE INFANTRYMAN AND COMBAT VEHICLE CREWMEN. I WOULD LIKE TO POINT OUT THAT ALL OF THE PROTECTIVE MASKS PROCURED USE A COMMON NATO STANDARD FILTER. THIS GREATLY SIMPLIFIES LOGISTIC SUPPORT, AND IS IN LINE WITH THE UNDER SECRETARY OF DEFENSE FOR ACQUISITION'S GOAL TO PROMOTE STANDARDIZATION AND INTEROPERABILITY. ALSO, IMPROVED CHEMICAL PROTECTIVE UNIFORMS, BOOTS AND GLOVES ARE IN PRODUCTION OR NEARING PRODUCTION STATUS. THESE LIGHTWEIGHT ITEMS FORM A COMPLETE, EFFECTIVE INDIVIDUAL PROTECTIVE ENSEMBLE WHICH PROVIDE SUPERIOR LEVELS OF PROTECTION AND IMPROVED WEARER PERFORMANCE OVER EXISTING OUTMODED ITEMS OF PERSONAL PROTECTION.

THE ABILITY TO DETECT CHEMICAL CONTAMINATION AND TO WARN OF IMMINENT CONTAMINATION IS ALSO A HIGH CHEMICAL DEFENSE PRIORITY. THE PURCHASE OF CHEMICAL DETECTORS BY ALL SERVICES IS PROVIDING AN IMPROVED DEFENSE POSTURE. TECHNOLOGICAL ACHIEVEMENT, THROUGH AN INTERNATIONAL COOPERATIVE PROGRAM WITH

THE UNITED KINGDOM, HAS MADE POSSIBLE THE ACQUISITION OF THE CHEMICAL AGENT MONITOR. THIS DEVICE IS A CHEMICAL DETECTOR WHICH WILL ADD MEASURABLY TOWARD OUR ABILITY TO OPERATE IN A THREAT CHEMICAL ENVIRONMENT.

THE AIR FORCE AND NAVY ARE PROCURING COLLECTIVE PROTECTION SHELTERS FOR BOTH FIXED BASE OPERATIONS AND MEDICAL FACILITIES. THIS WILL HELP CONTRIBUTE TO OUR CAPABILITY TO CONTINUE OPERATIONS UNDER THE STRESS OF CHEMICAL AND BIOLOGICAL CHALLENGE.

THESE DETECTORS AND CHEMICAL PROTECTIVE SHELTERS REPRESENT PURCHASES OF COMMON EQUIPMENT BY THE SERVICES. THEY NOT ONLY SIMPLIFY THE CONTRACTING PROCESS AND PROVIDE FOR THE ECONOMICS OF NUMBERS BUT SERVE TO FURTHER THE GOALS OF INTEROPERABILITY AND STANDARDIZATION. ADDITIONALLY, I WOULD LIKE TO POINT OUT THAT WE ARE PROCURING ALL CHEMICAL AND BIOLOGICAL DEFENSE EQUIPMENT COMPETITIVELY, WITH THE EXCEPTION OF A FEW FIRST RUN LIMITED PRODUCTION QUANTITIES.

A STRONG RESEARCH AND DEVELOPMENT EFFORT CONTINUES TO PROVIDE PROTECTION, DETECTION AND DECONTAMINATION OF PERSONNEL AND EQUIPMENT AGAINST NEW SOVIET CHEMICAL AGENTS AND ADVANCED BIOLOGICAL WARFARE AGENTS. THE THREAT'S BIOLOGICAL WARFARE

AGENT TECHNOLOGY IS EVOLVING FROM THE APPROACH OF USING NATURAL LIVING ORGANISMS AS AGENTS, TO THE APPLICATION OF BIOTECHNOLOGY FOR THE DEVELOPMENT OF A INCREASING ARRAY OF BIOLOGICAL AGENTS. TODAY'S MODERN BIOTECHNOLOGY METHODS PERMIT SOVIET AGENT DEVELOPERS TO EXPLORE LITERALLY THOUSANDS OF ALTERNATIVES WITH EASE, IN A SHORT TIME AND AT LOW COST. SOVIET AND OTHER THREAT NATION PRODUCTION OF MILITARILY SIGNIFICANT QUANTITIES OF BIOLOGICAL AGENT IN SMALL, EASILY HIDDEN FACILITIES WITH MINIMAL STAFF IS NOW POSSIBLE.

-IT IS NECESSARY TO OFFSET THE QUALITATIVE CHANGES TO THE EXPANDING THREAT. WE HAVE DIRECTED THE SERVICES TO CONCENTRATE THEIR DEFENSE EFFORTS ON FLEXIBLE, ADAPTABLE AND UNIVERSAL DETECTORS, MATERIALS, MEDICAL DEFENSE APPROACHES AND OPERATIONAL CONCEPTS TO PROTECT AGAINST A BROAD RANGE OF THREATS. THIS APPROACH NOT ONLY IMPROVES OUR DEFENSE POSTURE, BUT IT HAS THE DESIRABLE EFFECT OF NEGATING THE RESOURCES EXPENDED BY OUR ADVERSARIES IN DEVELOPING THE NEW THREAT AGENTS. AS I HAVE EMPHASIZED BEFORE, WE ARE NOT DEVELOPING BIOLOGICAL WEAPONS.

FIFTY-EIGHT PERCENT OF THE TOTAL CHEMICAL BUDGET IS ALLOCATED TOWARD CHEMICAL DEFENSE, AND ONE THIRD OF THIS IS TO BE USED FOR PROCUREMENT. WHILE THE PERCENTAGE OF TOTAL BUDGET DEVOTED TO CHEMICAL AND BIOLOGICAL DEFENSE EFFORTS HAS DECLINED

FROM 77 PERCENT TO 58 PERCENT OVER THE PREVIOUS YEAR, IT DOES NOT SIGNAL A SHIFT OF PRIORITIES. RATHER, IT REFLECTS THE EFFECT OF A TIGHTLY CONSTRAINED BUDGET WITH REDUCED DEPARTMENT OF DEFENSE TOTAL OBLIGATION AUTHORITY COMPETING WITH ALL MISSION AREAS TO DEVELOP A BALANCED PROGRAM. BUT DEFENSIVE MEASURES ALONE MAY NOT SUFFICE IN DETERRING FIRST USE. FEAR OF CHEMICAL RETALIATION ALSO PROVIDES A POWERFUL DETERRENT AGAINST USE OF ANY CHEMICAL OR BIOLOGICAL AGENTS. THERE IS NO CASE IN HISTORY WHERE A NATION WITH A STRONG DEFENSE POSTURE COUPLED WITH A CREDIBLE RETALIATORY CAPABILITY HAS HAD CHEMICAL WEAPONS EMPLOYED AGAINST IT. WE INTEND TO KEEP THE UNITED STATES FORCES IN THAT POSTURE AND WITH THAT CAPABILITY UNTIL A COMPREHENSIVE, VERIFIABLE AND GLOBAL CHEMICAL WARFARE BAN IS ATTAINED.

RETALIATORY PROGRAM

LET ME NOW TRANSITION TO A DISCUSSION OF OUR CHEMICAL RETALIATORY PROGRAM. WHILE THE UNITED STATES HAS MAINTAINED A CHEMICAL RETALIATORY STOCKPILE SINCE WORLD WAR I, THERE HAVE BEEN NO ADDITIONS OR MODERNIZATION TO IT SINCE 1969. TO PROVIDE A CREDIBLE DETERRENT, THE STOCKPILE MUST OF NECESSITY BE UPDATED TO MEET CHANGES IN BATTLEFIELD SCENARIOS, METHODS OF DELIVERY, STORAGE, HANDLING, AND SAFETY REQUIREMENTS. THE PRESENT

CHEMICAL WARFARE STOCKPILE IS 90% USELESS FOR MILITARY PURPOSES AND IS COSTING APPROXIMATELY $65M PER YEAR TO SAFEGUARD.

BINARY CHEMICAL WEAPONS MIX TWO SAFE CHEMICALS TO FORM A TOXIC CHEMICAL ONLY AFTER THEY HAVE BEEN FIRED, LAUNCHED OR RELEASED WHICH UNDER OUR POLICY, WILL NOT HAPPEN UNLESS AN ENEMY HAS FIRST USED CHEMICAL WEAPONS AGAINST OUR FORCES AND THE PRESIDENT HAS DIRECTED RETALIATION. THE BINARY WEAPONS ARE NOT ONLY SAFER TO MANUFACTURE, STORE AND TRANSPORT, BUT THEY CAN BE EASILY AND SAFELY DESTROYED SHOULD THAT BECOME NECESSARY.

THE THREE BINARY WEAPONS THAT COMPRISE OUR MODERNIZED CHEMICAL RETALIATORY PROGRAM ARE THE 155MM BINARY ARTILLERY PROJECTILE, THE BIGEYE BINARY CHEMICAL BOMB AND THE BINARY CHEMICAL WARHEAD FOR THE MULTIPLE LAUNCH ROCKET SYSTEM. THE 155MM BINARY PROJECTILE IS IN PRODUCTION. THE BINARY CHEMICAL WARHEAD CONTINUES IN ADVANCED DEVELOPMENT, AND TRANSITION TO ENGINEERING DEVELOPMENT IS SCHEDULED FOR THIS SUMMER.

155MM BINARY CHEMICAL PROJECTILE

WE ARE REQUESTING $66M IN FY89 FOR CONTINUED PROCUREMENT OF THE 155MM BINARY ARTILLERY PROJECTILE. THE 155MM PROJECTILE IS FOR USE WITH STANDARD US ARTILLERY TO PROVIDE A SHORT RANGE DELIVERY CAPABILITY OF LETHAL CHEMICAL AGENT IN RETALIATION FOR CHEMICAL ATTACKS AGAINST US FORCES. PRODUCTION IS FIRMLY

UNDERWAY AND FINAL ASSEMBLY BEGAN ON DECEMBER 16, 1987.

BIGEYE

AS AN EFFECTIVE DETERRENT, THE BIGEYE BINARY CHEMICAL BOMB REPRESENTS A MOST EFFECTIVE WEAPON BECAUSE IT PROVIDES A VERSATILE CHEMICAL DEEP STRIKE CAPABILITY. BIGEYE FILLS A CURRENT CRITICAL NEED.

ON JANUARY 19, 1988, IN ACCORDANCE WITH PUBLIC LAW 99-661, THE PRESIDENT SIGNED A PRESIDENTIAL DETERMINATION MEMORANDUM CERTIFYING THAT: (1) PRODUCTION OF THE BIGEYE BINARY CHEMICAL BOMB IS IN THE NATIONAL SECURITY INTEREST OF THE UNITED STATES; AND (2) THAT THE DESIGN, PLANNING AND ENVIRONMENTAL REQUIREMENTS FOR BIGEYE PRODUCTION FACILITIES HAVE BEEN SATISFIED.

IN 1986, THE CONGRESS APPROPRIATED $90M FOR BIGEYE FACILITIES. THE FOLLOWING YEAR, $34.4M WAS APPROPRIATED TO BEGIN BIGEYE PROCUREMENT. $99.4M IS REQUESTED IN FY89 TO USE THESE FACILITIES TO CONTINUE THE LOW RATE INITIAL PRODUCTION OF THE BIGEYE. IT WOULD BE APPROPRIATE TO SUMMARIZE RECENT BIGEYE OPERATIONAL TESTING AT THIS POINT.

BIGEYE OPERATIONAL TESTING SUMMARY

UNDER AN OPERATIONAL TEST PLAN APPROVED BY THE DIRECTOR, OPERATIONAL TEST AND EVALUATION, JOINT NAVY (OT-IIB) AND AIR FORCE (INITIAL OPERATIONAL TEST AND EVALUATION PHASE II) TESTING OF BIGEYE COMMENCED IN JANUARY 1987 WITH 58 WEAPONS. AFTER 10 WEAPONS WERE DROPPED, TESTING WAS HALTED BECAUSE OF UNACCEPTABLE RELIABILITY. DURING THE HALT IN TESTING, THE NAVY MODIFIED THE TAIL FIN ACTUATOR ASSEMBLY AND THE AIR TURBINE GENERATOR AND INSTALLED A MODIFIED CARTRIDGE SAFING DEVICE IN ALL THE REMAINING 48 WEAPONS. FOLLOWING RECERTIFICATION, TESTING RESUMED IN AUGUST 1987 AND CONCLUDED IN DECEMBER. I WOULD LIKE TO NOTE THAT REPRESENTATIVES FROM THE GENERAL ACCOUNTING OFFICE WERE INVITED TO OBSERVE ALL FACETS OF THIS LAST PHASE OF TESTING.

IN THIS PORTION OF TESTING, IT APPEARS THE BIGEYE MET ITS OPERATIONAL EFFECTIVENESS GOALS FOR DEPOSITION DENSITY AND ACCURACY. ALTHOUGH NONE OF THE PROBLEMS THAT LED TO THE HALT IN TESTING WERE REPEATED IN THE 48 DROPS SINCE TESTING RESUMED IN AUGUST, SEVEN FAILURES OCCURED. SIX OF THEM WERE EASILY TRACED TO QUALITY CONTROL TYPES OF PROBLEMS, AND FIXED. THE CAUSE OF THE REMAINING FAILURE HAS NOT BEEN DETERMINED. I THINK IT IS IMPORTANT TO STRESS HERE THAT NONE OF THE PROBLEMS THAT AFFECTED BIGEYE RELIABILITY WERE SAFETY RELATED. ALTHOUGH SOMETIMES THE TERM "RELIABILITY" IS CONFUSED WITH "SAFETY", IN

THE CASE OF THE BIGEYE, THE RELIABILITY ISSUES DO NOT IN ANY WAY AFFECT THE OVERALL SAFETY OF THE WEAPON.

THE DEPARTMENT CONDUCTED A HIGH LEVEL REVIEW OF BIGEYE, INCLUDING A PERSONAL REVIEW BY SECRETARY CARLUCCI IN DECEMBER. SECRETARY CARLUCCI REAFFIRMED THE DECISION MADE BY THE NAVY AND AIR FORCE BACK IN SEPTEMBER 1986--NAMELY THAT THE BIGEYE IS A SAFE WEAPON AND OF SUFFICIENT RELIABILITY FOR LOW RATE INITIAL PRODUCTION TO PROCEED. HOWEVER, WHILE LOW-RATE INITIAL PRODUCTION OF BIGEYE SHOULD BEGIN, THE DEPARTMENT IS COMMITTED TO DEMONSTRATING THE FULL RELIABILITY OF PRODUCTION MODELS OF BIGEYE BEFORE REQUESTING FULL-RATE PRODUCTION AUTHORITY.

THE OFFICE OF THE DIRECTOR, OPERATIONAL TEST AND EVALUATION, HAS PUT THIS WELL; "IF THE PRODUCTION FACILITIES ARE BUILT AND LOW-RATE PRODUCTION BEGINS, THE SERVICES SHOULD OPERATIONALLY TEST A PORTION OF THE FIRST PRODUCTION LOT TO RESOLVE ANY OUTSTANDING CRITICAL ISSUES, PARTICULARLY RELIABILITY. FURTHER PRODUCTION, BEYOND THE FIRST LOW RATE INITIAL PRODUCTION LOT, WHETHER LOW RATE OR OTHERWISE, SHOULD NOT PROCEED UNTIL THE COMPLETION OF A SUCCESSFUL OPERATIONAL TEST AND EVALUATION OF ARTICLES FROM THE FIRST LOT. THE BIGEYE

CHEMICAL BOMB SHOULD NOT BE DEPLOYED UNTIL THOSE OPERATIONAL TEST RESULTS DEMONSTRATE THE OPERATIONAL SUITABILITY AND EFFECTIVENESS THRESHOLDS HAVE BEEN ATTAINED."

BINARY CHEMICAL WARHEAD - MLRS

THE BINARY CHEMICAL WARHEAD FOR THE MULTIPLE LAUNCH ROCKET SYSTEM AFFORDS THE INTERMEDIATE CAPABILITY TO PROVIDE A HIGH VOLUME OF FIRE TO THE EXPECTED MASSED TARGETS BEYOND ARTILLERY RANGE. THE FULL SCALE ENGINEERING DEVELOPMENT PROGRAM REQUIRES $37.6M IN FY89. THE VALIDATION PHASE FLIGHT TEST PROGRAM IS REVEALING A SUCCESSFUL DEVELOPMENT EFFORT. CONCEPT VALIDATION FLIGHT TESTS IN 1986 AND 1987 HAVE SCORED 30 SUCCESSES OUT OF 30 TOTAL FLIGHTS. WE WERE ALSO SUCCESSFUL IN ALL NINE DISSEMINATION TESTS CONDUCTED IN THAT PHASE. IN FACT, TESTING TO DATE HAS DEMONSTRATED A HIGH LEVEL OF SUCCESS PROVIDING A SOLID BASIS FOR HIGH CONFIDENCE IN THE TECHNICAL DESIGN. WE ARE REQUESTING $4.5M FOR MILITARY CONSTRUCTION AND $16.4M FOR FACILITIES EQUIPMENT IN ORDER FOR US TO KEEP ON TARGET AND MOVE TO PRODUCTION IN THE EARLY 1990'S. THE PENALTY FOR FAILURE TO AUTHORIZE AND APPROPRIATE THIS $20.9M IS A ONE YEAR SLIP IN PROVIDING THIS VITALLY NEEDED DETERRENT SYSTEM.

DESTRUCTION PROGRAM

THE CHEMICAL DESTRUCTION PROGRAM HAS A SINGLE, UNEQUIVOCAL REQUIREMENT: SAFETY. THE DEPARTMENT OF DEFENSE WILL MAINTAIN SAFETY AS THE DOMINANT CHARACTERISTIC OF THE DESTRUCTION PROGRAM. THE ARMY, AS EXECUTIVE AGENT, HAS BEEN ACTIVELY WORKING ON THE DESTRUCTION PROGRAM. THIS YEAR THE ARMY WILL START DESTROYING THE INCAPACITANT BZ BULK AGENT AND BZ MUNITIONS AT PINE BLUFF ARSENAL, ARKANSAS. A DESTRUCTION FACILITY AT JOHNSTON ATOLL IN THE PACIFIC HAS BEEN CONSTRUCTED AND EQUIPMENT INSTALLATION IS ABOUT 75% COMPLETE. WE EXPECT TOXIC DESTRUCTION OPERATIONS TO START AT THAT FACILITY IN LATE 1989.

THE ARMY HAS JUST ANNOUNCED ITS RECORD OF DECISION FOR THE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR THE DESTRUCTION OF THE CHEMICAL STOCKPILE WITHIN THE CONTINENTAL UNITED STATES. IT CALLS FOR ON-SITE DESTRUCTION AT THE EXISTING STORAGE SITES.

IN ACCORDANCE WITH PUBLIC LAW 100-180, THE DEFENSE DEPARTMENT PROVIDED A CONCEPT PLAN ON THE COMPLETE DISPOSAL PROGRAM ON MARCH 15. THE PLAN INCLUDED THE COSTS AND SCHEDULES FOR THE CONSTRUCTION AND OPERATION OF ALL THE DISPOSAL FACILITIES. THE ARMY WILL BE ABLE TO DISCUSS MOST OF THE DETAILS OF THIS REPORT WITH YOU TODAY.

AS DIRECTED BY THE CONGRESS, CRYOFRACTURE TECHNOLOGY (DEFINED AS THE CRYOGENIC TREATMENT, FRACTURING, THEN INCINERATION) WILL CONTINUE TO BE DEVELOPED AS AN ALTERNATIVE DISPOSAL METHOD. THE SCHEDULE INCLUDES CONSTRUCTION OF A CRYOFRACTURE PILOT PLANT AT THE ARMY'S TOOELE ARMY DEPOT IN UTAH IN FY 1990.

CONCLUSION

I BELIEVE THAT THE DEPARTMENT'S CHEMICAL PROGRAM OF MODERNIZING THE RETALIATORY STOCKPILE AND EFFORTS UNDERWAY TO PROVIDE AN EFFECTIVE DEFENSE REPRESENTS A WELL BALANCED APPROACH TO MEET THE CURRENT CHEMICAL AND BIOLOGICAL THREAT TO US FORCES CONSISTENT WITH IMPOSED BUDGETARY CONSTRAINTS. THE PROGRAM PROVIDES THE NECESSARY DETERRENT CAPABILITY. IT IS MOST IMPORTANT NOW THAT WE MAINTAIN THE MOMENTUM OF THESE PROGRAMS.

YOUR CONTINUED SUPPORT IS GENUINELY APPRECIATED. WE WILL NOW BE PLEASED TO RESPOND TO YOUR QUESTIONS.

Senator EXON. Dr. Welch, thank you very much.

I would just like to ask at this time if Dr. Ritchie, Colonel Orton, or Captain Pfitzenmaier have any additions that they would like to make to the excellent presentation made by Dr. Welch. If so, we would be very pleased to have your comments at this time, and then I will be posing some questions.

Colonel ORTON. Sir, I might make a kickoff remark or two if you are willing.

Senator EXON. Certainly. Go ahead.

PRODUCING BINARY MUNITIONS

Colonel ORTON. I would like to report to you that the program to produce binary munitions is in progress, thanks to the support of the Congress. Beginning with the fiscal year 1986 appropriation, we were able to start putting together the production phase and begin the process of producing binary chemical weapons.

As you know, there were a number of conditions that accompanied the appropriation, that required actions that the Congress felt wise, and the executive branch as well, I think. And those conditions were met in the late months of last year and we were able to start final assembly of some of the artillery projectiles in December of 1987.

Now, our production approach is relatively complex because a binary weapons system never comes together as a single entity as we produce it, because we start separately and in separate components. And the matrix of conditions that we had to fulfill put us in a different pattern than the conventional as far as the use of our funds and the acquisition of the materiel we are dealing with.

However, I can report to you that we have that charted out. We have it under way, and the production of shells is proceeding.

We have about [deleted] in process right now and will continue to do that throughout the year. We also have the chemical warhead for the multiple launch rocket system now in the later stages of development, and that system is at a critical juncture in its development in which we need to proceed with some funding for facilities that will enable us to build the production test items and proceed with type classification of that weapon on a timely basis.

As you know, our program is accelerated. We are attempting to do certain things concurrently in order to get the binary munitions produced in time, that is in a timely fashion, to get them in the stockpile, so we can get rid of the unitary weapons that are out there and not useful to us.

I would like to hit head-on and start out with a comment or two concerning the proposal that some have made that we ought to just eliminate our funding for 1989 because we still have some in the bank for fiscal year 1987 and 1988. As I said, we are pursuing a program to get our artillery projectile in the stockpile by 1992.

That objective is both sound from a war-fighting point of view—we need to have those weapons that are militarily useful in the stocks so we can use them to deter other people's use of these kinds of weapons—and second, in support of the things Dr. Welch has outlined in the international negotiation arena.

If we are to meet that objective, we must have our funding in fiscal year 1989 as we have requested it. If that funding is not forthcoming, it will disrupt our program. Depending on the degree of cut, we may cause a break in production.

But in any case, it will delay the completion of the program by at least 11 months and add total costs to the program, as all of these slips do. So from my position as the program manager—and this position was just recently established to help us bring all of these things together, if you will—it would be a mistake in meeting our goal. It would make it impossible to meet our goal if we do not sustain our funding through fiscal year 1989.

Senator EXON. Thank you very much, Colonel.

If there are no further comments that this panel has to make, let me go to some questions that I have in my mind.

SOVIET CHEMICAL POTENTIAL

First, Dr. Welch, you indicated that there is chemical potential in some of the Soviet satellites around the world. What, briefly, is that potential chemical-wise? And when I talk about chemicals, I am talking about the whole broad field, including mustard gas and nerve-type weapons.

What is the picture with regard to our allies concerns? What about our European allies? Are they not also facing chemical threats?

Dr. WELCH. For many years, NATO has looked to the United States to provide its chemical weapon retaliatory capability. NATO has a policy which calls for a small retaliatory capability and has looked to the United States to provide this.

This will continue. Just as most NATO nations have looked to the United States to provide a nuclear capability, they look to us for the chemical capability.

In addition to this, France has announced that it is producing chemical weapons. In earlier statements they said that when they do produce it, it would be in the safest form possible, the binary form.

They have not made known the specific weapons systems they are going to use, but they have acknowledged publicly that nuclear deterrence is not credible in all situations and they see the need for a chemical retaliatory capability to deter first use of chemical weapons against their forces.

It is a policy which I think is very similar to ours, in that it recognizes the need for some gradation of deterrence. It recognizes that a conventional only and a nuclear only capability is not at all sufficient these days.

Senator EXON. Are you saying, then, Dr. Welch, that as far as the immediate future is concerned, the only one of our allies that we could at least expect some help from in this field are the French?

Dr. WELCH. To my knowledge, no other European nation has declared itself ready to produce chemical weapons.

Senator EXON. I think it is generally concluded and agreed by all sides that World War II was devoid of chemical weapons, strictly because of the fact that there was a deterrent on both sides and no one dared use it. It seems to me that this is a point that we have not done a very good job on selling.

I mean, that was our first "strategic" deterrent. In later years, we have talked greatly about the nuclear deterrent, and so far that has proven successful, although we wrestle with it all the time.

It is a concern of this Senator that when we talk about breakthroughs and we talk about Star Wars and we talk about all of the exotic new equipment that we have coming on down the line, including the black programs, but if there is one danger where there could be a breakthrough or a breakout that would significantly alter the military balance in the world, it would be if one nation or a series of nations were able to put together something that would suddenly be sprung upon the world society in general, that would be an all-encompassing threat.

And probably the only way that we would be able to respond would be to say: Well, if you do that, we would have no options but a nuclear strike. That is pretty scarey to this Senator, and I think we have not done a very good job selling that.

All of these people that are running around saying the Bigeye will not work and the Bigeye, if it did work, is not necessary I think have just overlooked what I think is the fact that we have got to have that deterrent, which we do not have at the present time.

Do you generally concur with my concerns?

Dr. **WELCH**. Yes, sir, very much. You are right on target, Mr. Chairman.

There is no question that it is a worldwide threat and that it is here now. There is just no question.

CHEMICAL WEAPONS IN AFGHANISTAN

Senator **EXON**. Let me ask you this. We have heard from time to time about at least some experimentation with chemical weapons in Afghanistan. Can you tell us anything about that this morning that we have not read about in the press to one degree or another over the last several years?

Dr. **WELCH**. [Deleted.]

Senator **EXON**. I am curious to know whether the Soviet troops are equipped with protective gear. And I assume that you believe that [deleted].

Dr. **WELCH**. Yes, sir, I believe it is mostly an [deleted].

Senator **EXON**. My time on the first round is up. I am very pleased to recognize now Senator Glenn.

Senator **GLENN**. Thank you, Mr. Chairman.

There is not anything that has been more misrepresented in the Congress than the binary. I have pursued this issue a long time, including addressing this when I was running nationally myself 4 years ago. Boy, did I ever take my lumps on that one.

I went to some places out there where other candidates blamed me and said: And he is for poison nerve gas and all of that crap. That is a little aside, Mr. Chairman. [Laughter.]

It still rankles me a little bit.

What we are trying to do is to have the weapons as a deterrent, to make them as safe for our own people as they can be, by going to binary instead of unitary, which is dangerous as the devil. If we ever do get leaks, they are already toxic right at that time. People will get killed in the bunker, or wherever it is.

BIGEYE

So I am a big advocate of the binary form. But I am a little bit troubled this year. The Bigeye, for instance, we say we have made improvements, that we have improved it significantly, and we are going to eliminate some of the difficulties that remain in the production line.

Now, the House has gone ahead, as I understand it, just reading the testimony here, their language in the report where they said they are for the binary capability, but they do not want to go ahead. And they have taken the $99.4 million that is in the 1989 budget and zeroed it out.

If that prevails, what happens to the program?

Dr. **WELCH**. Senator Glenn, first, thank you for your opening remarks regarding safety and the need for binary.

To respond to your specifics on Bigeye, it is, as you say, one of the most maligned weapons system. Information has been spread about the binary systems which does not reflect the fact of their performance at all. Bigeye in my opinion is another example of this.

Many on the Hill have been misinformed about its performance. It is for this reason that I have brought along this morning the program manager for the Bigeye bomb, as well as from the office of Jack Krings, Dr. Dee Ritchie, who looked at this from an independent testing point of view, to respond to your questions. And I will ask them to speak in just a moment.

The decision to go to low rate initial production of the Bigeye was made a number of years ago, and indeed Congress has appropriated funds to begin low rate initial production. This will permit us to build the first [deleted] bombs. Most of that money has been committed to contract, as a matter of fact.

We are at a point now where the question should be asked and is asked: Is Bigeye ready for full rate production, all-out production? The answer, as with most other bombs at this stage of development, is no. We are not going into full rate production.

It has, however, exhibited sufficient reliability, safety, and effectiveness, clearly, to go into low rate initial production. And this decision was made a few years ago.

Secretary Carlucci just a few months ago reviewed the entire program and said yes, that it is a good decision.

Senator **GLENN**. Okay. Well, I have a problem with this. Who uses the low rate ones if they are not as reliable as they should be?

Dr. **WELCH**. The low rate initial production——

Senator **GLENN**. We are saying we still have problems, so we are only going to low rate production. But if I am out there going to carry this thing, I want to know whether it is reliable or not, one way or the other.

If it is reliable, then I do not see what is wrong with going full scale. If it is not reliable, I am going to be very nervous about putting this thing in the airplane and taking off with it. It seems to me we either have it reliable or we do not.

And it bothers me a little bit on this low rate production. If we are going to low rate production and none of them are going to be put into use, that is one thing, if we are just using it for testing or something and never expect with low rate production for it to be a combat weapon. So if it is just for testing, okay, that is one approach to it.

But if we are going to low rate production, if the press starts talking about some of these things, then it gets a little bit shaky.

Dr. **WELCH**. Sure. Before I turn this over to the program manager, let me say just one thing. We do not see remaining problems in Bigeye that have to be fixed during production.

What we have seen during the test period were the identification of problems that were fixed, and the bomb was retested. [Deleted.] We think we have fixed the problems.

But like any other weapons system, we want to be extra careful. We are going to go into low rate initial production, drop some more bombs, and see if the production process has introduced any new problems.

This gets back to your very first point, I think, about misinformation about weapons systems, especially the binary systems.

But with your permission, Senator Glenn, let me turn this over to the project manager, the program manager for the Bigeye bomb, to address your question.

Senator **GLENN**. I have just one quote first. In Secretary Carlucci's letter, he says:

> Overall operational reliability remains several percentage points below the required threshold and that required for mature weapons. However, based on independent, OSD, and Navy feasibility studies, the remaining deficiencies are expected to be eliminated in the production line process.

BOMBS INTO COMBAT STOCKPILES

Several points below the required threshold. Are those bombs coming off now going into combat stockpiles?

Dr. **WELCH**. The low rate initial production will build bombs first for test purposes, to see that we have not introduced any new problems. And yes, the remaining would be part of that stockpile.

Senator **GLENN**. Thank you, and please go ahead.

Dr. **WELCH**. Larry.

Captain **PFITZENMAIER**. Good morning, Mr. Chairman. Good morning Senator Glenn. It is a pleasure to be here to help answer some of these questions for you this morning.

I would like to preface my remarks with a follow-up on what Dr. Welch has just briefly touched on, and that is that the Bigeye is a safe weapon. I would like to emphasize that reliability and safety are not the same thing.

Although we have experienced difficulties from a reliability standpoint—and I will go through those with you in some detail—we have never had a reliability failure that is related to safety, and we have never had a safety-related difficulty.

In fact, a number of reliability problems can be attributed to a series of safety devices which have been installed in the weapon. If

I may, I would like to back up to what we call our OT–IIB, or operational testing, which we began in early 1987.

We tested 58 weapons. In the first 10 releases, there were [deleted] failures as a result of [deleted] particular difficulties. One of those difficulties [deleted].

Additionally, in those first 10 releases we had [deleted] failures of the [deleted].

Dr. Welch has already mentioned the fact that we had three difficulties with [deleted].

Following that, in the remaining [deleted]. We will correct that with quality control procedures and training.

[Deleted.] We understand from the manufacturers and the other users of these devices that this is a random statistical failure and that there is little to be gained in doing an engineering analysis and trying to correct this, although we are looking at other suppliers of this particular piece of equipment.

What I am leading up to here is that all technical deficiencies have been identified and the corrections have been demonstrated in operational testing. There is not a problem that I am aware of with Bigeye that I do not understand. The reason we test is to determine what problems we have, analyze them, and correct them. When we enter low rate initial production, these corrections will be in place, Senator.

And again, to your specific question, from the first to the last of our low rate initial production we will have these changes incorporated and we will be delivering quality hardware.

I might add that I have a very strong personal interest in assuring that the contractor delivers quality hardware, because the Navy and DOD have gone on record stating that we will test [deleted] of these low rate initial production weapons, [deleted] by the Air Force and [deleted] by the Navy, to confirm that we are as smart as we think we are.

I need a motivated contractor to install these fixes correctly, to build good weapons for us, so that those [deleted] that I test are representative of the production rounds that I intend to deliver in full rate production.

Senator GLENN. If the House zeroes you out this year, what does that do to your testing program? Does that mean not enough weapons and not enough tests?

Right now they say they are for the program, but not until 1990.

BIGEYE TESTING PROGRAM

Captain PFITZENMAIER. Sir, if the House zeroes me out right now I will still be able to build, with prior year funding, [deleted] we are in closed session—[deleted] weapons. [Deleted] of those will be devoted to testing.

I have a problem, though, from several standpoints. I will be asking what I consider may be a non-motivated contractor to build the best weapons he knows how. We were not funded in 1988 for Bigeye, and if we are zeroed in 1989, I will be asking this particular contractor to just "trust me" that we have a program that does have a future, to turn it on, motivate his people and do the best he can. It is a difficult challenge even for a funded program.

Another result of the zeroing of 1989 funding, if that were to come to pass, would be our inability to build weapons in sufficient quantities to demonstrate minimum full-rate production. We would not be able to prove that the prime contractor could lay in parts, that his subcontractors could supply parts, and that his assembly line could produce final all-up rounds at a rate that approaches full-rate production.

If I am not funded in 1989, I would be forced to make some kind of extrapolation. I would have to direct the contractor to build for a week at what would be a full-rate schedule. Then I would have to judge whether he was capable of doing it for months or years.

The problem with that is the system can trick you. He can lay in parts to build for a week without much difficulty. He can turn the people on, motivate them, for a short period of time, usually successfully. It is a far more difficult challenge to do that for an extended period of time.

Senator GLENN. I see that my time is up, Mr. Chairman. I am sorry if I have exceeded it.

Senator EXON. That is all right, Senator Glenn.

BIGEYE TESTS

There is a round of questioning here that I was going to get into, and let us see if we can get some specifics. As you know, Secretary Carlucci wrote a letter to Chairman Nunn some time ago, and he indicated that the comprehensive evaluation of the Bigeye program will occur in March of 1988.

I guess what I am saying is it is after March of 1988. Where are we today? So I ask this of the panel: How many additional tests do you intend to conduct with regard to the Bigeye? What is the duration of the test cycle? When do you expect to have a final evaluation and the report on the results. Hearkening back once again to Secretary Carlucci's letter to Chairman Nunn, that letter clearly indicates that there are some problems.

And I really believe that those problems that are acknowledged by the Secretary of Defense are probably one of the reasons the House of Representatives decided not to fund this for fiscal 1989, which I agree with you, Captain, would be, it seems to me, a very foolish thing to do, with the gaps that we have in this particular field.

I guess what I want from you are some specifics as to where we are going, how fast we are going, when are we going to get there, and when can you give us the definitive answers that we need to go into the upcoming battle with the House of Representatives that I think is going to take place during the authorization process?

Captain PFITZENMAIER. Mr. Chairman, the reliability goal for Bigeye is written into our test and evaluation master plan as [deleted] percent reliability at the [deleted] percent confidence level. I happen to have difficulty intuitively understanding what "confidence levels" mean and relating them to numbers.

So I like to think of it in a different manner. A point estimate corresponding to that [deleted] percent at the [deleted] percent confidence level would be [deleted] successes out of 100 tests. That is our goal, and we are striving to achieve it and we believe we will be able to achieve it.

At the end of our first phase of testing, which concluded in 1985, we had a success rate, a point estimate, of [deleted] out of 100. At the conclusion of our most recent testing, the phase which I just described, that had grown to a point estimate of [deleted] out of 100, with the deficiencies identified.

Now, the reliability difficulties referred to by Secretary Carlucci and others were those which we identified in the most recent phase of testing. We are in full concurrence that those must be fixed and demonstrated before we request approval for full-rate production. We will not request that approval until after the additional testing of [deleted] weapons which I have described, at which time I believe the fixes which we will incorporate will give us the [deleted] percent reliability at the [deleted] percent confidence level.

BINARY RELIABILITY

Senator EXON. Let us get into this reliability issue. Senator Glenn made some reference to the fact that he was not so sure fellows would want to get into airplanes with this binary weapon if it were not reliable. When you talk about reliability, what do you mean?

Do you mean that it is not reliable from the standpoint that we should be worried about it accidentally causing a serious malfunction and a serious accident? Is that one of the reliability features?

Or is it not reliable as to whether or not it would properly mix to give us the action that we would hope for from a deterrent standpoint? Or is it a combination of all of these things?

Captain PFITZENMAIER. Mr. Chairman, that is a question that I am sincerely pleased to answer, because I think it is at the heart of the misunderstanding of Bigeye reliability.

It is my belief that if this were any weapon other than a chemical weapon, the numbers that I could relate to you would support, without a doubt, the entry into limited production.

The reliability that I am referring to is simply our ability to mix and disseminate the chemical. It is not related to any safety factors associated with the pilot, the crew, the ordnance personnel, or the handling people. This weapon will fail safe in every instance as a result of any of the reliability failures that I have described to you.

Senator EXON. So if I understand it correctly, from a layman's standpoint the reliability factor then is, will the Bigeye do what it is supposed to do after we drop it. Is that what you are saying?

Captain PFITZENMAIER. Yes, sir, that is correct.

Senator EXON. When will the [deleted] bomb tests take place and when will they be finished?

Captain PFITZENMAIER. They will begin in February of calendar year [deleted] and they will conclude in May–June of [deleted].

Senator EXON. My time is up. Senator Thurmond.

Senator THURMOND. Thank you very much, Mr. Chairman. Mr. Chairman, I am on several panels this morning and I would ask unanimous consent that my prepared statement be inserted into the record.

Senator **Exon**. We will be very happy to insert that, without objection.

[The prepared statement of Senator Thurmond follows:]

Prepared Statement of Senator Strom Thurmond

Thank you, Mr. Chairman. I join you in welcoming our two panels here this morning. This committee has consistently shown strong bipartisan support for the chemical weapons modernization program, and I look for a continuation of that support again this year. The need for a safe and modern retaliatory capability remains as strong as ever.

I look forward to today's testimony to provide an update on the progress of the 155 millimeter artillery shell, which is now in production, and the BIGEYE bomb. I am also interested in the status of efforts to develop a long range chemical weapon capability that does not depend on aircraft delivery.

Mr. Chairman, I also congratulate you for providing the subcommittee with an opportunity to hear testimony on the Chemical Demilitarization program. This program has recently completed two major milestones, and I look forward to receiving an update on how the fiscal year 1989 budget request supports the Record of Decision on the program.

Thank you, Mr. Chairman.

DICHLORIDE FACILITY AT PINE BLUFF

Senator **Thurmond**. Dr. Welch and Colonel Orton, if either or both of you would please answer this question. The House Armed Services Committee deleted $64.8 million of the $66 million requested for the 155 chemical round, citing concerns about the proposed production schedule of the dichloride facility at Pine Bluff.

Now, this is the question. Are binary rounds from prior year authorizations sufficient to cover the delivery that it appears is planned for rounds requested in the current budget, as is asserted in the House report?

Colonel **Orton**. No, sir, they are not. We have as a rule of thumb about 21 months of lead time to deal with the production of the Howitzer shell. About 18 months of that is actual procurement, 3 months or so of it is moving money after it is appropriated by the Congress to the contractors necessary to get them to move.

If we do not have the funding in fiscal year 1989, our problem will not be in 1989, but it will show up in 1990 and 1991, at which time we will have a break in our production.

Senator **Thurmond**. Dr. Welch, do you have any comment on that, or do you agree with his statement?

Dr. **Welch**. I very much agree with his statement, and I would add, Senator Thurmond, the psychological impact a zero budget in this area would have on the Congress and on others, to include those within the Department of Defense, if we let up the momentum that you have generated in the subcommittee with your efforts. If this is lost, it means that next year we start again, but flat on our backs. And it is going to be very difficult to pick up our steam again.

BIGEYE PRODUCTION

Senator **Thurmond**. My next question is this. The House Armed Services Committee deleted the entire $99.4 million request for Bigeye production, citing concerns about the proposed production schedule of the "QL," and load, assemble and pack facilities.

How do you respond to the House Committee's assertion that the required facilities will not be available in time to support Bigeye low rate and full scale production plans?

Captain PFITZENMAIER. Senator Thurmond, I find it peculiar that such a conclusion can be reached, that the facilities schedule will not support the Bigeye production. It possibly would be worthwhile to review that there are three facilities associated with the production of Bigeye.

One of them is the facility that will build the metal parts. The second is the facility that will fill the bomb and close it. And the third is the facility that will produce the QL.

The construction of two of these facilities was put under contract on February 12 of this year. The third one, the QL facility, was put under contract on March 3.

I do not understand how one can draw the conclusion, after only a month or a month and a half of contract execution time, that those 20-month contracts are behind to the extent that they will not support the construction of the bomb.

We have a contractual commitment with the folks who are building those facilities to complete them on a certain date. I have no reason to doubt that they will do that. The production of the weapon itself, actually bending the metal, is scheduled to correspond and to dovetail with the completion of those facilities.

Frankly, sir, I do not understand the statement in the House language which references the facilities.

Colonel ORTON. The Army is responsible for executing the contract for two of these facilities, the two you mentioned, Senator, the QL production plant and the fill and close facility for the Bigeye bomb.

As Captain Pfitzenmaier has outlined, those efforts are under contract. The contractors are responsible contractors, with good records—Combustion Engineering Corporation, the R.M. Parsons Corporation—with long experience in building major and complex chemical production facilities and munitions production facilities of all types.

Thus far, they are off to a running start. I would hesitate to make any predictions based on a month or so of work, but they are slightly ahead of the original schedule for the first month.

And I believe sincerely that we are not being unduly optimistic in believing that we will meet the schedule that is laid out. That schedule supports Captain Pfitzenmaier's production schedule. It is dovetailed in there to meet all of his requirements for production in the low rate production program.

Senator THURMOND. Dr. Ritchie, does your office maintain total independence from the Bigeye program, and what is your assessment of the current plan to base a full rate production decision on the results of operational tests using low rate production articles?

Dr. RITCHIE. Before I answer that, I would just like to reiterate Dr. Welch's earlier remarks. The Office of the Directorate of Operational Test and Evaluation which I represent——

Senator THURMOND. If you do not mind speaking up. I can hardly hear you.

Dr. RITCHIE. Sorry.

Senator THURMOND. Pull that mike up closer.

Senator EXON. Senator Thurmond, we are in closed session. We will ask the witness to speak louder.

Dr. RITCHIE. I will speak louder.

Our office is independent of all acquisition organizations, and we do not support the buying of weapons. I just want to put that on the record.

I am here not as a support witness of the program office, but rather as a representative of the independent operational test office in the Department of Defense.

One of your earlier questions was, "When are we going to have answers to the operational testing questions?" I would like to address that before I go on to your other question. Back in May of 1987, the Department was projecting, based on the then current schedule of operational testing, to have an answer for Congress on the operational test results by March of this year.

That was based on the completion, the expected completion, of that last round of operational testing, which was OT-IIB, to be completed in August or September of 1987. Because of some of the difficulties that were explained earlier by Captain Pfitzenmaier, testing was not completed until December 1987.

Therefore, our assessment of operational effectiveness and operational suitability, which we had promised in March, will not be ready until probably toward the end of May. We have an incredible amount of data to plow through in order to make sure that our answer is a good one.

To answer your question, Senator Thurmond, about how we feel about this full rate decision business, the operational testing just completed, OT-IIB, was intended to support a full rate production decision. The low rate initial production decision had been made in September 1986, based on results of operational testing prior to September 1986. And the Department supported entering into low rate initial production at that time based on those test results.

Those test results indicated that the reliability goals had not been met at that time, but that they were good enough, and that the Navy had a plan to correct some of the testing problems and the hardware difficulties in the bomb during low rate initial production.

Now, it turned out, because actual low rate production did not commence—the decision to proceed was made. However, the contingency was that first some environmental assessments had to be taken care of and the President had to certify that the Bigeye was in the national interest. And Dr. Welch's people were responsible for making that happen.

So, although the decison was made to go forward, it did not go forward until now. And we are dealing with that question at this point.

In the meantime, OT-IIB began, which was to provide the Department some information to help the decisionmakers decide whether or not to go into full rate production. So we have two separate processes going on here, overlapping in time.

Based on the most recent operational test results, which were to help the Department decide whether to go into full rate or not, the Director of Operational Test and Evaluation, based on what we know so far, has stated that, although he has no problem with the low rate initial production that is in process, we do not support entering into full rate production at this time.

And we have requested, and the Navy has agreed, to provide us weapons for another sequence of testing. And these are the [deleted] weapons that Captain Pfitzenmaier was referring to.

The next sequence of operational testing to give us a final answer for full rate production will take place in the first quarter of calendar year [deleted] I believe.

Captain **Pfitzenmaier**. That is correct.

Dr. **Ritchie**. So entering low rate at this point, we feel that we agree with the acquisition side of the house. We have no reason to argue with the decision to enter and continue with low rate at this time.

The one caveat we would place on that is, until the next sequence of operational testing in [deleted] demonstrates reliability—in other words, that the weapon works—that the reliability goal has been met, no weapons are to be deployed, period, until we know whether or not it works.

We will hold the Department to low rate production until we are satisfied that all of the criteria that the Department has set for reliability and operational effectiveness are met.

Senator **Thurmond**. Thank you very much, Mr. Chairman. My time is up.

Senator **Exon**. I would hope that we could ask any further questions for the record from this panel. We have to move on to Dr. Shannon and we have additional hearings this morning.

I would ask Senator Glenn if he has further questions that he could submit for the record.

Senator **Glenn**. Well, I have a couple of real fast ones right now.

STOCKPILE STORAGE

I understood Captain Pfitzenmaier to say that these would go into combat stockpiles. What you are saying is they will not go into combat stockpiles until some other tests have occurred. Is that correct?

Is there a difference here with the Pentagon?

Dr. **Ritchie**. I do not think there is a disagreement here on stockpile storage. I am led to understand—well, I suppose I had better defer to Captain Pfitzenmaier on this, on the differences in deployment and the stockpile.

Captain **Pfitzenmaier**. Of the [deleted] weapons that our prior year funding will allow us to build, we have test, training, safe separation vehicle, usage requirements for all of those weapons except for [deleted] of them. [Deleted.] Those [deleted] will be placed in storage after filling with QL.

If our testing proves successful, there will be an administrative reassignment of those weapons to the war reserve stockpile. But until the testing is complete, those will not be releasable for war reserve.

Senator **Glenn**. Okay. I would be happy to submit the rest of my questions. Just so you know what they are, the artillery shell program, I have some questions on that. Is that on schedule? Are there any problems with that?

And also how about basing? It is going to do little good unless we have some agreement to get them over there and get them over there quick, or have them on site over there. And our NATO allies have been anything but cooperative in that area, as I see it.

And so I think we need to discuss some of those issues, not only just about the production, which we are all very concerned about, but also about the potential use, where they are going to be based, who is going to do what. Those are the lines of some of my questions that I will submit to you for further response.

Senator EXON. Thank you, Senator Glenn.

There will be other questions that we will submit to you for the record, and we would ask that you give us a reply as quickly as possible.

Just in conclusion to this section of the panel, I would simply say to all of you that now that this March information that has now been extended to May, if it is extended into June, that we are going to go into conference with the House without anything to base our recommendations on.

And while I know that it is easy for us who look at the overall picture to criticize those of you who have to work with the detail, I just want to tell you that this is a critical period in this particular program.

And I suspect that you get involved in your own little empire, as you have to. But the whole empire is being played off one against another with an extreme shortage of funds. Unless we have more information than we have right now, I am not sure what kind of battle, as I indicated in my opening statement, we are about ready to put up with the House of Representatives to protect this program.

Folks, you have to do something for us or you are going to lose. And if you lose, the Nation loses.

Senator GLENN. We are on your side.

Senator EXON. I am just saying, get with it, will you, to help us out.

With that, we will ask Mr. Shannon to come forward and join us at this time.

[Whereupon, at 10:14 a.m., the subcommittee proceeded in open session.]

OPEN SESSION

The subcommittee met, in open session pursuant to notice, at 10:15 a.m., in room SR-222, Russell Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Glenn, Thurmond, and Quayle.

Staff present: Robert E. Bayer, Robert F. Bott, Sherri Wasserman Goodman, William E. Hoehn, Jr., Ronald P. Kelly, and Colleen M. Getz, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Milton D. Beach and Donald A. Mitchell, assistants to Senator Glenn; Karl H. Stegenga, assistant to Senator Quayle.

Senator EXON. Our next witnesses are Hon. John Shannon, Assistant Secretary of the Army for Logistics, and Brig. Gen. David Nydam, program manager, Chemical Demilitarization.

Senator THURMOND. Mr. Chairman, I ask unanimous consent that whatever previous questions have not been answered, and any others that we may have, be answered by the previous panel.

Senator EXON. Yes.

I had said that some additional questions would be in order.

Mr. Shannon, welcome, and please proceed.

STATEMENT OF HON. JOHN W. SHANNON, ASSISTANT SECRETARY OF THE ARMY FOR INSTALLATIONS AND LOGISTICS, ACCOMPANIED BY BRIG. GEN. DAVID NYDAM, PROGRAM MANAGER, CHEMICAL DEMILITARIZATION

Mr. SHANNON. Mr. Chairman, let me say that it is indeed a pleasure to appear before the subcommittee.

As you well know, I am very familiar with the members on the subcommittee. I have worked with you for many years. So let me publicly thank you, the distinguished ranking minority member, and Senator Glenn, before he departs, for all the help you have given us in the Army.

The Secretary of Defense appointed the Secretary of the Army as executive agent for the destruction of the chemical weapons, those presently that we have in the stockpile.

The Congress, in its fiscal year 1986 authorization act, said the destruction of those weapons should be completed by the year 1994.

Last year the Congress asked the Army to come back to the Congress and lay out its preferred method of destroying the chemical weapons stockpile, to tell the Congress whether or not we could do that in the timeframe set forth by the Congress, and to tell the Congress how much we felt the program would cost.

Let me briefly cover those four steps that we were supposed to report to the Congress by March 15. If we want to go into more detail, General Nydam, who is the program manager, is here with me to do that.

We submitted to the Congress on March 15 of this year a report which said that we could not make the 1994 date. The reason for that is that because of the requirements to go through the environmental process, for permits, and to complete the environmental impact statement, we have just completed that statement in January of this year. The Record of Decision was announced in February.

Now, in the final environmental impact statement, the Army considered four alternatives for destroying the chemical stockpile: do nothing, but the Congress said do something; or do it at a national site, which would be at Tooele Army Depot in Utah; or to consider two regional sites, one at Anniston Army Depot in Alabama or Tooele Army Depot in Utah; or the eight sites where the chemical weapons are located, at Anniston Army Depot, Alabama; Pueblo Army Depot Activity, Colorado; Newport Army Ammunition Plant, Indiana; Aberdeen Proving Ground, Maryland; Tooele Army Depot, Utah; Umatilla Army Depot Activity, Oregon; and Pine Bluff Arsenal, Arkansas. I think I named all of them—oh, Lexington-Blue Grass Army Depot in Kentucky.

The Record of Decision, as announced by the Under Secretary of the Army, then Mr. Ambrose, was that we, the Army, recommend destruction of the chemical munitions at the eight sites, where they are presently located.

The method of destruction, baseline process, which simply is, in layman's terms, as I understand it, Mr. Chairman, that we disassemble the weapons, that we reverse disassemble the weapons, as they presently are, separating the metal parts from the explosives, from the chemicals, and we destroy those parts in separate furnaces.

That is the method that we have chosen.

The reason for that is the method in which we have the most experience. We are presently in the process of building a destruction plant at Johnston Island in the Pacific, called JACADS, and that plant is 80 percent equipped now, and we will start testing the destruction of simulants this year, with a full-scale operational verification test at Johnston Island beginning in the fall of 1989.

In addition to that, the Army said that we should start the construction of a full-scale baseline plant at Tooele Army Depot this year, along with starting to build our training facility at Aberdeen Proving Ground this year.

We would construct the next three destruction facilities 2 years later. They would be Umatilla Army Depot, Anniston Army Depot, and Pine Bluff Arsenal.

We would be beginning to bring the last four facilities on line in the year 1992, and bring the last four on line at: Newport, IN; Aberdeen, MD; Pueblo, CO; and Lexington-Blue Grass, KY.

We would then terminate the program, hopefully late in 1997.

The Congress said look at technology. What technology is the best technology?

The Army has looked at two technologies. As I said, we have chosen a baseline, which is the separation of the weapon system and burning it in three separate furnaces.

There is another technology that we are looking at, which is called cryofracture incineration. That technology is that you dip or place the chemical weapons in a liquid nitrogen bath, freeze them, and then you press or crush them, and you burn all the components of the weapon in one furnace.

We have not completely tested that technology, and we do not know the full results of that technology because we may find use in that technology to destroy not only chemical weapons, but also conventional weapons.

We would hope to put on line a pilot plant which uses the cryotechnology at Tooele Army Depot in fiscal year 1992.

The reason we wanted to go pilot plant versus a full-scale plant, even though there is language in the congressional report which says the Army is to look at a full-scale cryo-plant is we thought that, as stewards of the American taxpayers and as stewards of this particular program, we should tell the Congress that bringing on line a full-scale cryo-plant would cost $120 million.

We can bring on a pilot plant which only costs $70 million. We can use the present power facilities as well as the lab test facilities and the sewage facilities presently at Tooele and build a pilot plant using those auxiliary parts of the plant already there.

We can design that plant so it can be expanded to a full-scale cryo-plant at some later date.

The total cost of the program in the year 1997, in constant year dollars, is approximately $2.7 billion.

Mr. Chairman, that completes my brief statement.

I would like to request that my entire statement be placed in the record.

Senator EXON. Without objection it is so ordered.

[The prepared statement of Mr. Shannon follows:]

PREPARED STATEMENT BY JOHN W. SHANNON, ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS AND LOGISTICS)

I am John Shannon, Assistant Secretary of the Army for Installations and Logistics. I appreciate the opportunity to appear before your committee today and discuss with you the current status of the Chemical Demilitarization Program.

As you know, the Army has recently completed several of the major milestones for this program. Two very important accomplishments include the completion, in January 1988, of the Final Programmatic Environmental Impact Statement for the Chemical Demilitarization Program and the announcement of the Record of Decision by Mr. James Ambrose, former Under Secretary of the Army, on February 23, 1988.

With the completion and release of the Final Programmatic Environmental Impact Statement comes the culmination of an intense 2-year Army effort designed to gather all the information required by the National Environmental Protection Act, and accompanying Environmental Protection Agency and Council of Environmental Quality (CEQ) regulations for use in making the program siting decision.

The Programmatic Environmental Impact Statement considered several alternatives for chemical disposal including on-site disposal at each existing storage installation; regional disposal at Anniston Army Depot, Alabama, for eastern storage installations and Tooele Army Depot, Utah, for western storage installations; national disposal at one destruction center at Tooele Army Depot; and the continued storage (no-action) option. Because of public comment, the Army also studies air transportation of the chemical stockpile from Aberdeen Proving Ground, Maryland, and Lexington-Blue Grass Army Depot, Kentucky, to Tooele Army Depot.

The Under Secretary of the Army, in making the Record of Decision, selected the on-site disposal option. As a result of this decision, disposal of chemical agents and munitions will take place at each of the eight installations within the continental United States where they are now stored.

As always, in making decision regarding the disposal of chemical agents and munitions, the Army's number one objective has been and will continue to be, to ensure maximum safety of Army personnel, the general public and the environment.

I am also pleased to report to you that the program to dispose of the incapacitating agent BZ will soon start. This spring, the Army will begin disposal operations at the recently completed BZ facility at Pine Bluff Arsenal, Arkansas.

Construction of the Johnston Atoll Chemical Agents Disposal System (JACADS) on Johnston Island in the South Pacific is now complete and 75 percent of the equipment has been installed. The final delivery of equipment is scheduled for this spring with integrated systems' testing scheduled for late summer 1988, preoperational testing set for the summer of 1989, and operational verification testing with actual munitions scheduled to begin in the fall of that year.

The fiscal year 1988-1989 Defense Authorization Act required the Department to provide a report to the Congress which lays out the schedule and associated costs for the entire Chemical Demilitarization Program. The Army submitted this report to the Congress on March 15, 1988.

First, the report states that, because of funding limitations and environmental delays, it is improbable that the congressionally mandated completion date will be attainable. In order to meet that completion date, the Army would have had to start construction of the first disposal facilities in the continental United States this year. There are no funds in the fiscal year 1988 budget for construction and the environmental documents are not yet complete.

Second, the JACADS reverse assembly/incineration process was chosen as the technology for destroying the chemical stockpile. It was selected because of the maturity of the technology data, ability to perform operational verification at the JACADS facility, and safety and environmental considerations. Use of the cryofracture/incineration process for destroying the chemical stockpile would require constructing a cryofracture facility and conducting operational verification test prior to building other facilities. Program completion would be delayed a minimum of 3 years. With an average storage costs of $60-$70 million per year, the cryofracture/incineration process becomes far more costly than the JACADS process, even though a cryofracture facility would cost approximately $10 million less than a JACADS-type facility.

Third, the construction of disposal facilities will start in fiscal year 1989 with a Central Training facility (to be used for training all the operations' crews) at Aberdeen Proving Ground, Maryland, and a full-scale disposal facility at Tooele Army Depot, Utah. The Tooele facility was scheduled early because it is important to get started at the site where 42 percent of the stockpile is located. Delay in the construction of the Tooele facility would not be cost effective, since storage costs average $60-$70 million per year. Also, the longer this facility is delayed, the longer it will take to complete destruction of the unitary stockpile.

Fortunately, this is the location where we have been destroying chemical munitions in our test facility called the Chemical Agents and Munitions Disposal System (CAMDS), located in the remote south area of Tooele Army Depot. Although the full-scale disposal facility will be constructed concurrently with the operational verification tests at JACADS, installation of most of the equipment for the facility will occur after a design verification phase that will look at lessons learned from the Johnston Atoll operations. This will allow the Army to make changes to the Tooele facility prior to the start-up of operations.

Disposal facilities will be constructed at Anniston Army Depot, Alabama; Pine Bluff Arsenal, Arkansas; and Umatilla Army Depot Activity, Oregon, in fiscal year 1991, after completion of the operational verification tests at JACADS. The last facilities will be constructed in fiscal year 1992 at Aberdeen Proving Ground, Maryland; Lexington-Blue Grass Army Depot, Kentucky; Newport Army Ammunition Plant, Indiana; and Pueblo Army Depot Activity, Colorado. This schedule gives the Army the opportunity to take advantage of the lessons learned during the operational verification tests at JACADS, but will delay the completion of stockpile disposal to 1997.

Fourth, Congress has indicated its desire for the Army to continue exploration of the cryofracture destruction process. We have closely studied several options for doing this and have concluded that the prudent course of action is to construct a cryofracture pilot plant at Tooele Army Depot in fiscal year 1990 to augment the JACADS reverse assembly/incineration process.

Before the Army could begin construction of a cryofracture pilot facility, we will have to complete an environmental impact statement, hold public scoping meetings and issue a formal Record of Decision. Permits will have to be issued by the Environmental Protection Agency and the State of Utah, and the Department of Health and Human Services will have to review planned pilot plant operations and monitoring, as well as quality assurance and quality control plans.

Cryofracture is not a new method to destroy chemical agents. The Army began development of this process several years ago. The cryofracture process takes the full munition, cryogenically cools it in a liquid nitrogen bath, then crushes the frozen munition using an hydraulic press and incinerates the pieces in a single furnace.

Although we know that the cryofracture process more simply accesses chemical agent for destruction, the Army is concerned about the efficiency of incinerating all the frozen components of the munition in one furnace. We have never placed an agent-filled munition which has been cryogenically cooled and fractured by a press into an incinerator for destruction as a single integrated process. The Army feels that the cryofracture process has not yet been fully tested and that it is premature to construct a full-scale cryofracture plant at this time. The Army, therefore, plans to construct a cryofracture pilot plant at Tooele Army Depot, Utah, collocated with the CAMDS.

Capital costs for the pilot plant will be approximately $74 million (fiscal year 1988 constant dollars) compared to a capital cost of $121 million (fiscal year 1988 constant dollars) for a full-scale cryofracture facility. The advantages of constructing a pilot plant and collocating it with the CAMDS facility are reduced equipment costs and elimination of the requirement to construct support facilities such as a chemical laboratory, medical support facility, and power and utility services.

The pilot plant will be constructed with the flexibility for easy expansion to a full-scale cryofracture facility. Operation verification of the cryofracture process will take place at this facility. If the cryofracture process proves successful, the pilot plant will be used to destroy portions of the chemical stockpile at Tooele Army Depot. This would shorten the completion of the disposal program at that site. Also, the Army will look into the feasibility of using all or part of the cryofracture process in destroying conventional ammunition.

Finally, costs for this program have been included in the March 15 report by fiscal year. Total requirements for the Chemical Demilitarization Program are approximately $2.7 billion.

Mr. Chairman, thank you for the opportunity to make this written statement. Brigadier General Nydam, program manager for Chemical Demilitarization, and I will do our best to answer your questions.

Mr. SHANNON. I stand ready to answer any questions the committee may have.

Senator EXON. Thank you very much for your excellent statement. We have accepted your full statement for the record.

I guess the concerns that I have with this whole program are timing and how fast we are moving. I appreciated the fact that you took time to go through some of that in specific detail, which is certainly helpful to us.

EDUCATION PROGRAM FOR COMMUNITY

Are you planning a public education program for the community near which the destruction facilities will be constructed and operated? I think this is a very important public relations matter that we have to discuss.

What are your plans in that area?

Mr. SHANNON. Mr. Chairman, we have had public scoping meetings at every location where we presently have those chemicals stored. There has been a great deal of public interest, more at some locations than at others.

We plan to work with each community. We have requested $100 million in our final plan as a part of the execution plan to develop emergency reaction plans at each one of the locations. Although FEMA will be responsible as the Federal agency for those activities, we, the Army, will take full responsibility to ensure training takes place in each community, to work with each community, to ensure that each community understands the impact of what is going on, that the medical facilities are notified.

We do that now, Mr. Chairman, but we will even increase our efforts to ensure that, prior to putting up plants, that each community understands.

Presently, wherever we have munitions stored, there is a reaction plan, there is a notification plan, we work with the local community, the local law enforcement agencies, and the local medical facilities, to ensure that, if anything happens, the community is notified. Right today we do that.

But in this case we must do that even more than we do now because of public perception. There is fear there because of a lack of understanding, and you have to make sure that the communities understand what you are doing so that they can be of assistance to you, as well as being able to respond in case there is some type of accident.

Senator EXON. Are you telling the committee that there have been no serious problems on these series of informational meetings that you have held in the affected communities?

You know, what we are concerned about is we always run into these things after the fact—"Well, I didn't know that was going to happen in this community." Or, "Oh, yes, I knew there was a meeting of some kind, but it wasn't very well publicized, and now we've got this mess on our hands, and why didn't you do something about it ahead of time?"

Those are the things we have to guard against because oftentimes we do not.

I think you are trying to do a good job. I just want to emphasize that this is tremendously important, so that we don't run into lawsuits or actions in the future that would compound our problems.

Have you generally been successful, Mr. Secretary, in explaining how you are going to go about this? Have you not had any serious opposition thus far?

Mr. SHANNON. Mr. Chairman, we have had opposition, as Senator Quayle well knows, particularly at three sites. There has been opposition, but very friendly opposition. They have expressed very clearly how they feel about destruction of chemical weapons on site—specifically at Newport, IN; at Lexington, KY; as well as at Aberdeen, MD.

At the other five sites, there has been less concern and there has been cooperation at all sites. I can assure you that I don't know of any community that doesn't know it is going to happen. We had to do that when we went through the environmental impact statement.

I have worked with some of the Governors. We have made sure that we have met with the local communities, the local officials, and they have all expressed their concerns.

As I said, five sites have expressed the desire that we place the plants there and get on with it. Three sites have some apprehension, and I can understand their apprehension.

Specifically, Newport is a unique situation because bulk nerve agents are stored at Newport in ton containers—no munitions there. So that makes them unique.

Therefore, each site is a specific concern that we have to look at.

When we did the environmental impact statement, it was a programmatic impact statement because it is national in nature.

If you start moving chemical weapons, you must realize that if you go to regional sites, that is, one on the east coast and one on the west coast, you involve 16 additional States.

If you go to a national site, such as Tooele, UT, you involve 20 States, and at each one of those locations where those chemical munitions would pass through or pass by, you would have to do an environmental impact statement for that, you would have to ensure that there are emergency response plans for each of the 20 States involved.

So, yes, I can say with confidence that each community has been notified. Each community has expressed its concerns. There have been some concerns that have been favorable and supportive, and some that oppose it. We will have to work with those communities, and we intend to.

We have presented to you, to the Congress, what we think the best plan is, and we will carry out the instructions of the Congress and the Secretary of Defense when we are told to do so.

Senator EXON. Thank you, Secretary Shannon.

My last question has to do with the chemical demilitarization schedule.

What will be the impact on the chemical demilitarization schedule of the requirement in the House Armed Services bill that the Johnston Atoll demilitarization facility be certified ready for full-scale production before equipment prove-out and system tests at other continental U.S. facilities can occur?

Mr. SHANNON. The Army has no problem with that.

The impact of that, let me explain, is that we do not intend to destroy any chemical munitions in the continental United States until we have completed an operational verification test at Johnston Island.

I assume, however, that the Army can continue testing and equipment prove-out operations at our pilot plant at Tooele Army Depot. This facility, called the Chemical Agent Munitions Disposal System (CAMDS), will be needed for baseline and cryofracture testing.

What the Army is saying is if you would like to complete the programs in 1997, and that is the earliest that we think you can do it, we must now start to turn dirt at Tooele. You must turn dirt now, because it takes you 2 years to bring the facility on line. It takes you another year to run your test at Tooele, and it takes you another year to run your verification tests at Tooele.

We will run a verification test at each location.

JACADS at Johnston Island comes on line this year. We will run a 1-year test of simulants. Next year, in 1989, we will run a year to 16 months test of live agents, which means January 1990, before we actually start to run full-scale destruction at Johnston Island. We do not complete the Tooele plant until 1990. Then we have learned lessons from the Johnston Island plant, and we start our verification tests at Tooele.

That is the impact if we do not start to turn dirt at Tooele.

Why Tooele? Because Tooele has the largest—60 percent, and if I am correct, someone stop me—40 percent of the stocks are at Tooele. It takes longer to destroy those there than at any other place. So that is why we would like to start to physically put the plant up at Tooele next year.

So that is the impact of not facilitizing our starting at Tooele or any other plant in the United States until you complete a verification test at Johnston Island.

A verification test at Johnston Island would be completed in January 1991. If you wait until then to start to turn dirt at any facility in the United States, you cannot complete the program until the year approximately 1999.

Senator EXON. Thank you.

Senator Thurmond.

Senator THURMOND. Thank you very much, Mr. Chairman.

Since we have another hearing coming on very shortly, I want to ask unanimous consent that my questions just be answered for the record.

Senator EXON. Without objection.

Senator THURMOND. I also ask that I be allowed to yield to Senator Quayle since he has a plant in his State and I am sure he has some questions that he would like to ask.

Senator EXON. I think that is in order, since you have not taken your time.

Senator Quayle.

Senator **Thurmond**. Senator Quayle, I am going to let him answer my questions for the record and will yield my time to you, since you have a plant in your State.

Senator **Quayle**. OK. Thank you very much, Senator Thurmond and Mr. Chairman.

First, Mr. Chairman, I have a statement that I would like to place in the record.

Senator **Exon**. Without objection, we will accept that for the record.

[The prepared statement of Senator Quayle follows:]

PREPARED STATEMENT BY SENATOR DAN QUAYLE

Mr. Shannon, General Nydam, thank you for your testimony here this morning.

I was very interested to see the Department's March 15 revised request for the chemical weapons demilitarization program in fiscal year 1989. This revised request is, in terms of timing, much more realistic, and addresses some very real concerns I have over the safety of the proposed demilitarization program.

The funding requested for this year will allow for the construction and operation of test facilities that will provide needed information on the technology requested by the Army for this program, and the approach presented as the safest and most efficient method of destroying these weapons and agent stocks.

Given the concern over the proposals to destroy, and indeed over the continued storage of the chemical stocks stored at the Newport Army Ammunition Plant in Indiana, I was particularly pleased to see that the revised schedule envisions a complete testing of the incineration facilities at Johnston and Tooele Army Depot in Utah for performance and safety before taking further action at the other chemical weapons and bulk storage sites.

The safety and well-being of my constituents is, of course, my paramount concern. Beyond the complete and thorough testing of the technology and facilities at Johnson Island and Tooele, I urge the Army to revise and upgrade the current emergency response for the Newport Plant to more adequately address current storage conditions and risks—as was noted in a letter from the Indiana State Board of Health to General Nydam dated February 8, 1988.

I was also encouraged by the Army's responsiveness to my, and others, concern regarding safety by the addition of $100 million for emergency preparedness and response in the revised budget request.

I understand, and fully expect, that some of these funds would be used to immediately begin improvement of emergency response plans at the various sites throughout the country, regardless of final decisions on the overall demilitarization program. These steps are badly needed regardless of the timetable or outcome of final program decisions.

I was encouraged by the Army's statement that they plan to work closely with the responsible State and local officials to ensure their health and safety is in no way compromised. I can assure you that I will work to see that this promise is carried out in my State of Indiana.

I have several additional questions which I am submitting for the record. I look forward to your responses.

Senator **Quayle**. Mr. Shannon, as you well know, you and your people have been very responsive and cooperative in dealing with the Newport situation. Let me just emphasize three things that I think are still very, very important.

First—and I think this is most important—is that there be absolutely no shortcuts, period, on safety in this program. We have to make sure that you have gone through the full testing and evaluation and that safety is, in fact, the most important aspect of this.

Second, I think that there needs to be—and you have done some additional work on this—we need to make sure that the emergency preparedness plan is fully understood, fully available, and that the community has an appreciation of this.

Third—and I think that this perhaps is something on which there has been some improvement, but it is going to have to continue to improve, otherwise we are going to have problems, at least in my State—is to make sure, as you said in your testimony, that you engage in very good contact and have a working relationship with the local community.

This thing has to be talked about with them. The public relations and the discussion of this has to be not only professional, but on a very detailed and systematic basis.

Quite frankly, we have an overall role here in the Senate to make sure that this is done as good public policy. We have a responsibility to make sure that this issue is addressed not only to our satisfaction, but to the satisfaction of our constituency.

But when we really become involved is when our constituency feels that they are being short-changed or they don't understand why this is going on, or they think that there are better alternatives out there. And when they start responding, then all of a sudden we get involved.

So we are sort of dual-hatted. We have a public policy and an oversight role in the appropriations process here; but, we also have a very definite link to our constituency. And when they, in fact, feel—as a good segment of them feels—that things are not going right, you can be assured that you are going to hear from me and from others.

I think that the third point, the whole public relations aspect, really needs to be addressed so that they are satisfied. You're not going to satisfy everyone, of course, but you have to satisfy the great majority in a community that you are doing the right thing, plans and preparations made should something happen to go wrong. wrong.

I think that thus far, at least in Indiana, I think we have made some progress. But we have a long way to go.

I will just leave it at that.

If you want to respond, that is up to you.

Mr. Shannon. My response, Senator Quayle, is hear! hear! I agree. We did not do a very good job in Newport in the beginning. But I promise you we will do better. We have to develop a relationship with those communities that gives them the confidence that we are doing the right thing and the best thing. Although it may not be best for them, it is best for the rest of the Nation, and they are willing to accept that in their community, although it is not something that they want.

I agree with you 100 percent.

Senator Quayle. But it will, in fact, be best for them if, in fact, we address that safety issue.

Mr. Shannon. I agree.

Senator Quayle. That is the issue that has to be addressed. That is why I think we have the testing to go through.

Mr. Shannon. I agree, Senator Quayle. You don't have any objection here. We have to do a better job and we will do a better job.

DEMILITARIZATION FACILITIES

Senator **Quayle**. Is it the Department of the Army's intention to construct other demilitarization facilities at storage sites like Newport before the facilities at Johnston Island and Tooele are proven safe?

Mr. **Shannon**. Senator Quayle, first of all, we are not going to do any demilitarization until we have completed our operational tests at Johnston Island. We have phased the program so that you have the flexibility, not only the Army, but the Congress, to fund it in a flexible manner, in a phased type operation.

We bring on line four facilities first, beginning with Tooele, and following Tooele, we bring three facilities on line—Anniston Army Depot, Umatilla Army Depot Activity, and Pine Bluff Arsenal.

Those plants are in operation and running before we bring on line the last four plants, of which Newport is a part.

So, yes, we are phasing them so that we can learn lessons from not only Johnston Island, which is our big test facility, but from each plant. If there are lessons to learn, we will be able to incorporate those lessons as we bring other plants on line.

Senator **Quayle**. So, basically, for Newport, it would be safe to say that until the safety is proven at Johnston Island and Tooele, you will not, your intention would not be to begin construction of the demilitarization unit.

Mr. **Shannon**. What you are saying in correct.

Senator **Quayle**. It is correct.

Thank you very much, Mr. Chairman, and thank you, Senator Thurmond.

Senator **Exon**. Thank you.

Senator Glenn.

Senator **Glenn**. Thank you, Mr. Chairman.

I am concerned about the existing danger and what we are getting into. I go back a little bit, a few years, when we were fighting this program and trying to get some funding for the binaries and talking about the unitary danger, and making calls back and forth to Europe several times a day to David Abshire there, in his role as NATO Ambassador.

Senator Cohen is not here this morning, but he and I were particularly involved in that and did a lot of work on it.

We were told at that time that there is a lot of concern about leakers in existing artillery shells and potential leakage out of the bulk storage, perhaps.

LEAKERS AT EXISTING STOCK PILES

So my question is, where do we stand with regard to reliability of existing stockpiles? How, are they contained, the 1 ton containers that are 61 percent, or so the newspaper report says, of the amounts in there leaking?

Is there a problem with corrosion and deterioration in either the shells or the bulk storage where any of this stuff is?

You may recall some of the perturbations that we went through a couple of years ago. They were a big concern to us. That was one of the reasons we were trying very hard to get binary, so that we could do away with this stuff.

Now, I cannot think of a better combat target if we ever went to war than this. If I were an enemy pilot, I would consider it a great coup if I could get in there and blow up some of this stuff. You are going to raise cain for everything that is downwind of that place for quite some period of time. There isn't any doubt about that.

I would not want to see the arsenal up the road, above Baltimore, get whacked when the wind was coming out of the northeast.

So, there is that problem. But there also is the problem of the leakers, the bulk storage. Is it reliable, should we have a greater sense of urgency because there are some other problems like that?

Mr. SHANNON. Senator Glenn, I am going to let General Nydam answer that. He is the project manager and he came all the way from Baltimore, so I think he should have an opportunity to testify.

Senator GLENN. Well, he is closer to the problem than I am, if that thing ever gets hit up there.

General NYDAM. Senator, currently our office works out of the Aberdeen Proving Ground, the Edgewood area, where the stocks that you are referring to are located.

The stockpiles that we have in the eight locations within the continental United States, and also CONUS, have a very elaborate security system and a surety system to watch over it, which is in place.

There are, in addition to the normal fencing, wire, and security guards, backup security forces and intrusion detection systems. So some of the things that we would normally think of could not happen, we feel, while they are stored on these installations.

As far as the leaking munitions go, yes, we have something over 1,000 of what we call leaking munitions in the inventory right now. These are munitions that are detected in normal, routine, daily or quarterly surveillance programs that go on at each of the installations.

The exact way that each of the stockpiles are surveyed varies from location to location, installation to installation, depending on the type of munition that is there.

Senator GLENN. Let me stop you, if I might.

You say you have 1,000 leakers. Are these potentials, now, or are these ones that you actually have had drips out of?

General NYDAM. Those are the ones that have been detected, sir, and normally it is not a drip-out. It is an emission of a vapor that is detected at a very low level. When this happens, the rounds are then overpacked in another container which then renders them safe to store. They are stored separately from the stockpile munitions until the demilitarization program gets underway.

Yes, there are about 1,000 of those right now.

Senator GLENN. That have actually been containerized because they have vapor that shows that they are leaking or that they are going to leak worse, perhaps?

General NYDAM. Yes, sir.

Senator GLENN. Well, in the bunkers where these things are stored, do you have detectors in there to detect any deterioration or anything like that?

How do you do that?

General NYDAM. Sir, these things are inspected routinely and periodically with detectors, and we have what we call first entry monitoring systems. Every time you go into a bunker, you go in and monitor first.

Senator GLENN. The number that you are getting leakage on, does that go up in a curve, or is it a straight-line function, or does it level off? In other words, some leakage might occur out of any stockpile over a period of time and then level off once that leakage has occurred, because of faulty seal pressure or whatever.

But is this going up? Are you getting more leakers per year?

General NYDAM. That is a difficult question to answer, sir. Not specifically. We are not seeing any more leakage than what we had expected to see in the past, with a minor exception.

We had predicted, for example, that this fiscal year we would see something like 64 more leaking munitions, and during the winter months we got an increase in leakers, or the rate that they were showing up at would predict that we would get 80 at the end of this year.

So, even though the number is not too big, it is a significant increase. What is curious to me is that it happened during the winter months, when the cold temperatures usually keep this detection down somewhat.

Senator GLENN. These are not temperature controlled bunkers, then. These get hot and cold as winter and summer goes.

General NYDAM. That's correct, sir.

Senator GLENN. So you have expansion and contraction that occurs naturally that would add to the process.

That's 1,000 leakers out of what sized stockpile?

General NYDAM. That's classified, sir.

Senator GLENN. Okay. We'll get that separately.

[The information follows:]

LEAKING MUNITIONS

The number is slightly over 1,000 potentially leaking items out of a stockpile that contains over [deleted] munitions.

Senator GLENN. That is very, very interesting to me, that you are having a problem like that.

How about your bulk storage?

General NYDAM. Sir, there is one thing that I can make clear. That 1,000 is a very, very small percentage of the total stockpile.

Senator GLENN. I am aware of roughly what the stockpile is, but I will get the figures on that later.

How about the bulk storage? Is there a corrosion deterioration problem on that?

General NYDAM. No, Sir.

For example, we were talking about Newport a little bit earlier. The ton containers that have the agent VX in there, that has proven to be very stable over the years.

Senator GLENN. If you detect leakage out of a 1-ton bulk container, though, you are going to have to put that in quite another container to seal it up.

Do you have plans to do that, if you detect any leakage?

General NYDAM. What we do with those, sir, is we transfer those to another container if we find those.

Senator **Glenn**. You transfer them from one container to another and then just seal up the old container?

General **Nydam**. Yes, sir.

We don't overpack the big 1-ton container like we do a projectile.

Senator **Glenn**. Well, it is a problem that is not going to get less as time goes on.

General **Nydam**. Absolutely not, sir.

Senator **Glenn**. So there is some urgency to getting this program underway and getting it funded, which I guess is the bottom line for us.

General **Nydam**. Yes. There is deterioration of the plugs that are involved in the ton containers, and those are looked at and changed out periodically.

Senator **Glenn**. Did you ever have anyone get into one of these bunkers where there was some leakage and be in danger? Or do they go in with masks and gear that seals them up to protect them against this when they go in the bunkers?

General **Nydam**. Yes, sir. They go in masked.

Senator **Glenn**. That's frightening, Mr. Chairman, if we have 1,000 that are already sealed up.

Those are 1,000 that are already sealed up, isn't that right?

General **Nydam**. Yes, sir.

Senator **Glenn**. Thank you, Mr. Chairman. My time is up.

Senator **Exon**. Thank you, Senator Glenn.

Gentlemen, thank you very much for your excellent testimony. There will undoubtedly be some additional questions for the record that we would appreciate your responding to as soon as you possibly can.

We will now move on to the FEMA portion of our hearing this morning.

[Questions for the hearing record with answers supplied follow:]

Questions Submitted by Senator Strom Thurmond

CHEMICAL AND BIOLOGICAL

Senator **Thurmond**. Dr. Welch, in your testimony, you note that the percentage of total budget devoted to defense efforts has declined. What is the comparison between last year and this year in absolute terms, and what do you envision the level of effort for chemical and biological defense efforts will be in the next five years?

Dr. **Welch**. Last year, our chemical and biological defense request was for slightly over $777M. In fiscal year 1989, our request is for almost $636M. In these times of tighter defense budgets, I would envision the chemical and biological defense budget over the next five years maintaining pace with the rest of the defense budget.

Senator **Thurmond**. Dr. Welch, you noted in your prepared testimony that biotechnology methods make production of lethal agents possible in a short time and at low costs. What are the corresponding issues associated with the delivery of such agents on the battlefield or elsewhere—can this also be accomplished with relative ease?

Dr. **Welch**. The delivery of such new agents could be accomplished by the same means as for many of the classical agents—namely by artillery, rockets, tactical ballistic missiles, and gravity bombs. Therefore, it should not pose any great difficulty to "weaponize" these new agents.

Senator **Thurmond**. Dr. Welch, you state in your testimony that this country does not and will not possess biological warfare weapons. What efforts are this country taking to defend against an enemy's use of biological weapons?

Dr. **Welch**. In the 5-year period from fiscal year 1983–87, we spent $322.9M pursuing biological defense research. In the five year period preceding this (fiscal year 1978–82), we spent $85.7M. Our increased efforts were in the areas of antidotes and prophylaxis, generic detection systems and other defensive equipment as well as an overall system of medical combat casualty care.

Senator **Thurmond**. What is the status of efforts related to development of a long range, binary chemical delivery system to complement the Bigeye?

Dr. **Welch**. The Department submitted a preliminary assessment to Congress last August that looked at possible candidates for a long range binary chemical delivery system. I emphasize that the report was a preliminary look at these systems. Indeed, one of the systems identified, [deleted], has encountered problems in development and was cancelled. [Deleted.]

Senator **Thurmond**. Captain Pfitzenmaier, what is the reliability threshold for the Bigeye bomb, and what is the level that has been achieved to date in operational testing?

Captain **Pfitzenmaier**. The reliability threshold for the Bigeye bomb is [deleted] at the [deleted] percent lower confidence level. To date, the Bigeye has achieved [deleted] percent reliability at the [deleted] percent lower confidence level.

Senator **Thurmond**. You noted that the threat today increases the likelihood that U.S. forces will encounter biochemical threat agents other than those for which their equipment has been developed. How serious do you judge this possibility to be, and what are its implications for the development and acquisition of defense measures that are ongoing?

Dr. **Welch**. I view this to be a very serious threat—one that we must address in our ongoing research and acquisition programs. We are doing that by looking at equipment to cover a broader range or class of threat agents. While the implications of new agents can defeat our current equipment are obvious, we must remember that not all of our potential adversaries are going to have the latest biochemical threat agents at their disposal. It is most likely that they will have the classical agents for which our current equipment is well suited. As our research on new threats progress and we begin to acquire new equipment, we would naturally want to replace the old equipment with the new.

Senator **Thurmond**. Do you believe that the commitment of Secretary Weinberger in May of 1987 to keep the Congress fully informed on the status of Bigeye testing was completely honored in Secretary Carlucci's recent update on Bigeye testing?

Dr. **Welch**. Yes, I do. Secretary Weinberger committed to a personal review of the Bigeye, a review which could not take place until all testing was over. That testing was over in December 1987, at which time Secretary Carlucci followed through on Secretary Weinberger's commitment and conducted a Secretarial Performance Review. This review was preceded by a meeting of the Nuclear and Chemical Committee of the Defense Acquisition Board. The results of these reviews led to the recommendation for the President to certify the production of Bigeye as in our interest, which the President did in January of this year.

Senator **Thurmond**. The House Armed Services Committee also deleted the binary requests related to the multiple launch rocket system, citing that it was premature to build production facilities so far in advance of data from development flight tests. How do you respond to the House recommendation?

Dr. **Welch**. We must clarify the record. Currently, the program has reached the stage where we begin to construct pilot production facilities—technology prove out for the equipment to make the rockets and warheads. The funding deleted by the HASC would build up and equip our pilot facility for the injector, one of the binary components. This same facility, after prove out and modification, will be used to produce injectors for the stockpile.

The test rounds produced during this pilot production are required for production qualification testing (PQT). This is why the funds are required now—the PQT is scheduled for 1991—we need fiscal year 1989 money to insure our ability to test and prove our production technology. This is part of the development process.

If the fiscal year 1989 funds are not restored, there will be a year for year slip in the program and a program cost growth of about 13 million dollars.

The Army has structured this program to provide firm technical basis for the system and save money at the same time.

ON-SITE CHEMICAL DISPOSAL

Senator **Thurmond**. Would you summarize for the committee the principal factors that led to the selection of on-site disposal of chemical agents?

Mr. **Shannon**. Mr. Ambrose, Under Secretary of the Army in making the Record of Decision for the Chemical Demilitarization Program selected on-site disposal for the following reasons:

1. The on-site disposal alternative is the best choice from a public health and environmental perspective, and was identified in the FPEIS as the safest of all alternatives.

2. The on-site disposal alternative reflects a realistic appraisal of the Army's ability to mitigate accidents, including the feasibility to implement viable emergency response measures.

3. On-site disposal is less vulnerable to sabotage and acts of terrorism.

4. On-site disposal is far less complex in terms of logistics, including security, emergency response and safety requirements, and the Army has a much great ability to control those requirements at fixed sites.

CRYOFRACTURE TECHNOLOGY

Senator **Thurmond**. Your statement is not a ringing endorsement for the cryofracture process. Were there no congressional interest in this method of destruction, would you recommend that funds be spent on a cryofracture pilot plant?

Mr. **Shannon**. Former Under Secretary of the Army Ambrose told the Congress last year that the Army would work with you to develop the best program for destroying the stockpile of chemical agents and munitions. I believe we have done that. The Chemical Stockpile Disposal Program Implementation Plan is a well thought-out, prudent course of action that will provide the safest approach for this program.

The cryofracture process does show promise. However, the Army does not feel it is developed enough to warrant construction of a full-scale cryofracture facility at this time. By constructing a pilot scale facility we will be able to prove out the destruction capability of the cryofracture process and provide information for further usefulness of the process for chemical destruction.

If both the chosen process and the cryofracture process prove to be successful, the cryofracture pilot plant can be used to destroy chemical weapons at Tooele Army Depot, the site where the largest percentage of our stockpile is stored. In the future, the pilot plant canbe used to determine the feasibility of utilizing all or portions of the cryofracture process in destroying conventional ammunition. The Army has, and will continue in the future, to have a significant problem in demilitarizing conventional ammunition.

ADVANTAGES AND DISADVANTAGES OF DISPOSAL METHODS

Senator **Thurmond**. What are the principal advantages and disadvantages of the two methods of chemical munition destruction?

Mr. **Shannon**. The principal advantage of the reverse assembly/incineration process that is being used at the Johnston Atoll Chemical Agents Disposal System (JACADS) are:

(1) The use of separate incinerators which are designed specifically for the four types of materials being destroyed, i.e. chemical agent; explosives, propellants and fuzes; metal shell bodies and agent containers; and dunnage.

(2) A more extensive data base with respect to specific chemical munition/agent disposal, as well as, comparable industrial experience.

The principal disadvantage of the JACADS process is in the complexity of the multistep munition disassembly process.

The cryofracture/incineration process offers a simplified projectile handling process by freezing and fracturing the projectile rather than mechanically taking it apart. This process also has the advantage of handling the agent in munitions in a frozen state which reduces the potential for contaminated areas in the plant. However, the cryofracture process cannot be used to destroy bulk agent which makes up approximately 62 percent of the stockpile.

The primary disadvantages of the cryofracture process are the limited test data and the use of a single furnace system for all waste streams. Because a single furnace is used, operating temperatures are compromised to satisfy the mixed feed (agent, propellant, metal parts and dunnage), thereby requiring a more complex furnace design and operation. For example, the JACADS process uses a dual chambered liquid incinerator for agent destruction that operates at 2,800 degrees Fahrenheit in the primary chamber while the cryofracture process uses the common deactivation furnace operating at 2,200 degrees Fahrenheit to destroy all waste including the chemical agent.

Questions Submitted by Senator Dan Quayle

EMERGENCY PREPAREDNESS

Senator **Quayle**. On February 8, 1988, the Assistant Commissioner for Health Maintenance of the Indiana State Board of Health wrote to General Nydam commenting on the "Chemical Weapon Stockpile Disposal Program Final Programmatic Environmental Impact Statement." The Commissioner made four specific comments on the statement, and urged the Army to upgrade the emergency response plan currently in place at the Newport Army Ammunition Plant. Has Dr. Danielson's letter and comments been responded to by the Army? Are steps being taken to immediately upgrade the emergency preparedness plan for the bulk stocks of agent stored at Newport?

General **Nydam**. During the public comment period between the release of the Final Programmatic Environmental Impact Statement (PEIS) in January 1988 and the Record of Decision on February 23, 1988, numerous comments were received by the Army from Federal and state agencies as well as private citizens. All of these comments, to include those written by Dr. Danielson were provided to Under Secretary of the Army, James Ambrose for his consideration in making the Record of Decision. No specific answers were written to the many comments made during this period, with the exception of saying that the comments would be forwarded to Mr. Ambrose for his consideration. Dr. Danielson's comments will be addressed fully in the site-specific Environmental Impact Statement for the Newport Army Ammunition Plant (NAAP).

Concerning upgrade of the emergency response plans for Newport, only preparatory actions have been accomplished to date. The commander of NAAP has been attending many local meetings to discuss current emergency capabilities and to objectively explain current safety and security measures. In addition, the Department of Health and Human Services has started to visit local medical facilities. However, as you know, these actions are preliminary to what is required. Later this year, the Army's contractor will start interfacing with the communities to develop emergency response requirements. The Army and the Federal Emergency Management Agency (FEMA) will not dictate what is required. I want to emphasize that the emergency response plan will be the communities' (county or district) plan. We will assist in providing the expertise and, if appropriated, the funding to accomplish the plan together.

SITE-SPECIFIC ENVIRONMENTAL DOCUMENTATION

Senator **Quayle**. The Army has announced that it will in the future conduct site-specific Environmental Impact Statements at each of the current storage sites before construction of disposal facilities is undertaken. I understand there has been debate over the scope of these site specific studies. Will these studies examine the choice of on-site incineration or transportation to another disposal facility in light of the risks of the weapons or stocks stored at the individual sites?

Mr. **Shannon**. The site specific environmental documents that will be completed for each of the eight disposal locations, will not examine transportation of chemical agents and munitions. Transportation to a regional or national disposal facility was examined in the Final Programmatic Environmental Impact, which was completed in January 1988. However, if a site specific environmental document reveals a valid reason that on-site disposal is inappropriate for a specific site, then transportation options will be evaluated for that site.

CONSTITUENT MAIL

Senator **Quayle**. On March 18, 1988, Senator Lugar and I wrote to General Nydam forwarding a letter from one of our constituents, who questioned a technical assumption and procedure used by the Army in the FEIS. Has the Army responded to this letter?

General **Nydam**. Yes, the Army responded to Ms. Darnell's letter and provided a copy of that response to your local staff member Mr. Lane Ralph.

STABILITY OF AGENT VX

Senator **Quayle**. When was Agent VX stored at Newport last tested for stability?

Mr. **Shannon**. We last tested the purity and stability of Agent VX at Newport Army Ammunition Plant in May 1975. We then sampled eight bulk lots which had been manufactured between August 1963 and June 1967. Their purity ranged from 87 percent to 91.7 percent pure (the range was 89 to 94 percent pure at time of manufacture). Stabilizer content was in the range of .7 percent to 1.9 percent (it had been 1.4 percent to 3.8 percent when manufactured.

EMERGENCY PREPAREDNESS

Senator **Quayle**. Of the $100 million requested in the revised budget for emergency response, how much is included in the fiscal year 1989 budget request for emergency preparedness efforts?

Mr. **Shannon**. Of the $100 million requested for emergency reponse, $11.8 million was included in the fiscal year 1989 budget request.

[Whereupon, at 10:46 a.m., the subcommittee recessed, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

TUESDAY, APRIL 12, 1988

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES
AND NUCLEAR DETERRENCE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

CIVIL DEFENSE PROGRAM

The subcommittee met in open session, pursuant to notice, at 10:48 a.m., in SR-222, Russell Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Nunn, and Thurmond.

Staff present: Robert F. Bott, Sherri Wasserman Goodman and Ronald P. Kelly, professional staff members; and Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Donald A. Mitchell, assistant to Senator Glenn.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. The subcommittee will please come to order.

As the chairman indicated at the beginning of the day, this is an open session. The subcommittee now meets to receive testimony on the civil defense request of the Federal Emergency Management Agency, or FEMA.

The fiscal year 1989 request is $160.4 million, which is almost a 20-percent increase over last year's authorization. At a time when much of the defense budget is being increased little, if at all, such large increases need to be essential to our Nation's security.

Last year's authorization bill prohibited the withholding of civil defense funds from a State for its refusal to participate in the simulated nuclear attack exercise.

In its report on this bill, the Armed Services Committee stated its intention to review the Civil Defense Act for its consistency with the dual-use aspects of civil defense.

We hope that today's hearing will help the committee in its review of this matter.

We are pleased to welcome Mr. Julius W. Becton, Jr., Director of the Federal Emergency Management Agency.

Unless Senator Thurmond has an opening statement, we will proceed with your testimony, Mr. Becton. But I would ask first if Senator Thurmond has an opening statement.

Senator THURMOND. I have a very brief statement, Mr. Chairman.

Mr. Chairman, I join you in welcoming Director Becton before this subcommittee and wish to extend my personal congratulations to the Director for the fine job he is doing as Director of the Federal Emergency Management Agency.

Under his leadership, the agency has sharpened its focus on the issues of most importance to this subcommittee.

The FEMA budget request this year is a tribute to the importance of the civil defense effort to our overall national security, and to the leadership of Director Becton in making the case for civil defense in a very tight budget environment.

Mr. Chairman, last year I had some concern that there was a movement away from the sharp focus on national security considerations as the principal purpose of the civil defense program. While I applaud the efforts of the agency in dealing with emergencies other than nuclear attack, and fully support the dual use of systems developed under the Civil Defense Act, I will not support the use of funding in the defense function, 050, for civil defense activities that do not have an attack preparedness rationale.

Thank you, Mr. Chairman.

Senator EXON. Thank you very much, Senator Thurmond.

There will be questions following your testimony, Mr. Becton, and we undoubtedly will have some additional questions for the record to which we would appreciate your responding as promptly as you can.

For now, I am very pleased and honored to welcome you here this morning. You direct a very, very important agency.

At this time, I will accept, without objection, in full the statement that you have prepared. I would very much appreciate your summarizing at this time, and then we will have some questions.

I will also submit a statement by Neil Goldschmidt, Governor of Oregon to be made a part of the printed record. An additional statement by Myra Thompson Lee, Administrator, Oregon Emergency Management Division will be retained in the Armed Services Committee files.

[The prepared statement and attachment of Governor Goldschmidt follow:]

TESTIMONY

on behalf of

NEIL GOLDSCHMIDT, GOVERNOR OF OREGON

Mr. Chairman, members of the committee, this testimony is being entered on behalf of Governor Neil Goldschmidt of the State of Oregon.

As you may remember, Cory Streisinger, a member of the Governor's staff testified a year ago on this subject. At that time the primary issue was related to FEMA's requirement that the state participate in a nuclear war exercise. It was and is Oregon's position that such an exercise is neither required under the Civil Defense Act nor is it a desirable activity on which we wish to expend money or resources.

Later in the year we had a more fundamental disagreement with FEMA on the use of Civil Defense funds within the state. It is our contention that as long as the activities conducted under the provisions of the Act are in compliance in so far as they are `consistent with, contribute and do not detract from attack related civil defense preparedness' we are eligible for funds to continue the programs we have carried on for over thirty years.

Governor Goldschmidt went so far as to appoint a task force of concerned legislators and public officials to consider the issues and to recommend a course of action. The Chairman Wayne Fawbush, a representative in the Oregon Legislature, conducted a public hearing and heard testimony from concerned citizens, public officials, emergency program mangers and service providers. Their conclusions are summarized in a report which is appended to this testimony.

The Task Force conclusions closely parallel those of both the House National Defense Authorization Act and the Senate Defense Appropriations Act. Oregon feels that extremely limited resources can best be utilized by building a strong infrastructure that will support response to all probable hazards, including nuclear. It is our position that planning for a strategic nuclear war is beyond the requirements of the law and is not a responsibility of state government to perform. Further, we believe in a balanced program for emergency preparedness, one that gives proportional consideration to the most probable events that a community or state may encounter.

Oregon is requesting Congress to not only continue the `Sense of Congress' language as indicated in the Acts, but to go a step further and amend the current law as follows;

TITLE III - CIVIL DEFENSE
SEC.3382 - WITHHOLDING OF FUNDS FOR FAILURE OR REFUSAL TO PARTICIPATE IN SIMULATED NUCLEAR ATTACK EXERCISE OR **NUCLEAR WAR PLANNING**

Funds available to the Federal Emergency Management Agency [in fiscal years 1987 and 1988] for

> obligation under the Federal Civil Defense Act of 1950 may not be withheld or withdrawn on or after the date of the enactment of this Act from any State or any other entity on the basis of the failure or refusal of such State or other entity to participate in a simulated nuclear attack exercise or nuclear war planning. Any such funds withheld from payment to a State or other entity before the date of the enactment of this Act on such basis shall be paid to such State or other entity, as the case may be, at the earliest practicable date after the date of the enactment of this Act.

We believe that our program fully supports the Civil Defense Act and, as required, provides an attack-related preparedness and response capability. We are very willing to continue to address attack related planning within the context of all hazards planning and to consider available information and planning tools to do so. However, we reserve the right to determine the hazards to concentrate our efforts on at any given time and to determine the level of preparedness we wish to establish and maintain.

Mr Chairman, members of the committee, we continue to be concerned and disappointed in FEMA's narrow interpretation of the law and feel that any past or future threats to cut off funding are totally unwarranted. Such acts do nothing to promote a positive working relationship and in fact, continually disrupt the productivity of the programs at both the state and local level. Although we reached an agreement with FEMA for this year we fear that further attempts will be made by them to force us into the position of appearing to advocate a mentality which promotes preparing for war over preparing for actual emergencies as an acceptable function of state government. If we are to ever have a nationwide preparedness it can only be accomplished in a spirit of cooperation.

WORDS IN BOLD TYPE HAVE BEEN ADDED TO THE TEXT
WORDS IN BRACKETS WOULD BE DELETED

EMERGENCY MANAGEMENT EVALUATION TASK FORCE REPORT
SUBMITTED TO GOVERNOR NEIL GOLDSCHMIDT
BY REPRESENTATIVE WAYNE FAWBUSH, CHAIRPERSON

EMERGENCY MANAGEMENT EVALUATION TASK FORCE REPORT

BACKGROUND:

Since 1943 the State of Oregon has required some level of emergency planning and preparedness activities be carried out in order to assure an adequate level of response to emergencies and disasters as a means of protecting life and property. Currently, ORS 401.305 mandates each county in the state to establish and maintain emergency management programs that provide for the coordination and management of, specified emergency services.

The funding of these activities has been and continues to be a combination of local, state and federal funds. Each year the State of Oregon, through the Executive Department's Division of Emergency Management enters into an agreement with the Federal Emergency Management Agency to carry out these emergency planning and preparedness activities. The federal program provides approximately 1.1 million dollars to state and local agencies under the Civil Defense Act of 1950 [USC App 2281-2286] as amended in 1981 [PL 97-86].

Until 1974, eligibility for these funds depended on the willingness of state and local government to focus these planning efforts strictly on attack-related planning. At that time state and local emergency management agencies were successful in their efforts to have the Civil Defense Act amended to include natural hazards as an element of the definition of "Civil Defense".

This new definition immediately broadened all components of the program and ultimately resulted in an acceptance by the federal government of the concept of all-hazards planning and preparedness through the cooperative efforts of multiple agencies and jurisdictions. However, the Federal Emergency Management Agency has maintained a strong emphasis on the attack-related elements of the Act. In doing so it has narrowly confined attack-related activities to the planning and preparation for nationwide nuclear attack.

In the recent past the emphasis by the Director of the Federal Emergency Management Agency has nearly excluded the all-hazards approach. It has seriously restricted and, in some cases, disallowed local and state government from applying the very limited resources to activities that they have determined would meet their overall needs more appropriately.

The situation that resulted in the appointment of a task force to review the issues related to the emergency management system in Oregon is two-fold. Opposition was first generated when the Federal Emergency Management Agency produced a nuclear attack scenario that depicted a massive nuclear weapons laydown in the Pacific Northwest, in order to fulfill a condition set forth in the 1986 Comprehensive Cooperative Agreement. The scenario for Oregon contemplated a total of 48 nuclear weapons, of 1 to 2 megatons, falling on 7 separate localities and causing massive numbers of deaths and injuries.

Following the refusal of Governor Goldschmidt to participate in the original nuclear attack scenario a compromise with the Federal Emergency Management Agency was finally reached. Although not the option of choice, it was somewhat less offensive than the first scenario. However, The Governor considered the compromise only as a short term solution and not one that really addressed the issues raised by both citizens and local and state officials.

The second issue as identified by the Governor was in relation to his concern regarding the inclusion of nuclear attack planning activities in the 1988 CCA that might reinforce the perception that a massive nuclear weapons exchange could be survived and that existing government and societal systems would be capable of providing services at much the same level as they do currently.

Due to the Governor's previous efforts, the Oregon Congressional Delegation has been actively pursuing the Federal Emergency Management Agency's ability to withhold funds from state agencies if they do not adhere to FEMA's prescribed methods of nuclear attack planning. Such activities include;

I. The House Armed Services Authorizing Committee Report lanquage indicated concern with apparent priority given to attack preparedness and its intentions to update the Civil Defense Act. This legislation has passed the full House.

II. The Senate Armed Services Authorizing Committee Report language also indicates plans to review the Civil Defense Act and update it to make it consistent with dual-use aspects of civil-defense. This legislation has passed the full Senate.

III. The House Appropriations language to the HUD Independent Agencies appropriations bill for FY'88 telling the agency not to terminate or limit any emergency management assistance grants pending changes in authorizing legislation has passed the full House and is expected to pass the full Senate as well.

PROCESS:

Governor Goldschmidt recognizing the value of the general provisions of the Civil Defense Act and wishing to involve the policy makers of the jurisdictions that would be most affected by any decision he makes in regard to the state emergency management program, established a task force with two primary mandates; (1) to observe and evaluate the September 15-17 Increased Readiness Reporting exercise that replaced the original Nuclear Detonation Reporting exercise, and; (2) to review the sections of the Comprehensive Cooperative Agreement that contained activities directed at establishing a massive nuclear attack response capability.

The task force appointments included representation from the Legislature, County Commissioners, and the Oregon State Sheriff's Association. The members of the task force include;

Commissioner Jeff Golden - Jackson County
Commissioner Gladys McCoy - Multnomah County
    Mr. Hank Miggins - alternate
Commissioner Ed (doc) Stevenson - Coos County
Representative Wayne Fawbush - District 56
Mr. Phil Keisling - Legislative Asst. to House Speaker, Vera Katz
Sheriff Norman Neal - Douglas County

Representative Wayne Fawbush was asked by Governor Goldschmidt to chair the committee and the Emergency Management Division provided staff support. Chairman Fawbush provided for public input by conducting a public hearing which was followed the next day by a work session of the task force.

Governor Goldschmidt sent a letter and copies of the Comprehensive Cooperative Agreement to all County Board Chairpersons of the counties that receive federal funds for their local programs, to the Oregon Congressional Delegation and to State Legislators for the purpose of informing and involving them in the overall process. They were asked to review documents and to provide their comments by October, 15.

The comments that were received in the Governor's office were supportive of the decision not to sign the CCA as drafted. However, most counties wish to maintain their programs and encouraged negotiation on the areas of disagreement. The comments reflected a strong desire to treat attack and nuclear problems the same as any other hazard rather than singling it out for special consideration.

There is also a concern related to the unrealistic expectation that the very limited funds provided would be sufficient to address such problems in any meaningful way. It seems to be the consensus that attempting to do so would ultimately result in an inequitable amount of time and resources being expended to accomplish "nuclear attack" planning leaving little if any time to address the hazards faced by the communities on a day to day basis.

Materials provided to the task force by the Emergency Management Division included;

Increased Readiness Reporting Exercise Scenario

Reporting forms and instructions

Proposed 1987 Comprehensive Cooperative Agreement

Nuclear Attack Planning Guide-90 (NAPB-90)

Copies of the 1950 Civil Defense Act - Title V

Emergency Management Division line item budget breakdown

Letters from local elected officials

Other materials as requested

RESPONSE TO GOVERNOR'S QUESTIONS:

QUESTION: Was the exercise a useful test of our emergency management capabilities?

ANSWER: Yes - generally speaking - However, it was not felt that a scenario reflecting increasing worldwide political tensions can be realistically reflected at the local/state level.

QUESTION: Was it a good use of our planning resources?

ANSWER: Again, in general terms, "yes." It was felt that the planning should address realistic local situations that would require testing of functional procedures such as interagency and intergovernmental communications, mass evacuation, reception and care, law enforcement, fire control, medical response, etc.

The magnitude of a national or worldwide situation leaves too many questions unanswered related to national policy and control which could impact response at the local level. Local and state government do not (nor do they expect to) have the resources to build the level of defense capability stated or implied by the Federal Emergency Management Agency. Even FEMA cannot fund the type of "civil defense" program that their federal guidelines require.

QUESTION: What went well and what went badly?

ANSWER: The testing of communication which was the stated objective, was felt to be productive. While there were some related problems most agencies were able to communicate on all of their available systems. The question was raised as to how effective any of these systems would be following a nuclear detonation. Unfortunately, if the systems were unprotected, as most are, and precautionary measures were not implemented, few government agencies would have any communications capability left.

While every EMA jurisdiction participated, there was little communication between local jurisdictions. This was considered to be an element that needs to be incorporated in the design of the next scenario.

QUESTION: How could future exercises be better structured to meet our emergency management needs?

ANSWER: Future exercises should address local and regional problems. There are very few emergencies or disasters of which the direct effects impact the entire state at once. Therefore, manpower and resources would be available from the unaffected areas but would require agreements and preplanned activities in order to readily access and relocate.

QUESTION: Should we be participating in this type of exercise in the future?

ANSWER: It was felt that any scenario which would result in a massive exchange of nuclear weapons represents a situation that could not be responded to by local or state government because the essential systems would be irreversibly disrupted if not totally destroyed. However, events of a lesser magnitude could and should be planned for and exercises should be conducted. Such exercises could include floods, severe weather, hazmat incidents, terrorist incidents or radiological events. Any FEMA exercise which would require statewide reporting to Region Ten should be co-developed by the Oregon Emergency Management Division. Congress should not allow FEMA to dictate either the type of exercise to be conducted nor the scenario.

CONCLUSIONS:

I. It is absolutely essential that the Civil Defense Act which provides funding assistance for local and state emergency management programs nationwide, be changed to provide for more discretion in prioritizing the planning and program needs of the government entity.

II. The State should not participate in any future nuclear attack scenario that includes an exchange of nuclear weapons. It is felt that such an exchange would preclude a viable survival of either citizens or the government, and that such planning helps foster unrealistic and dangerous thinking about the possibility of any meaningful survival of a nuclear war.

III. It is recognized that there are a number of situations far short of a nuclear attack that might result in widespread nuclear generated radiological fallout and would require a major response by local and state agencies. Such situations could include a transportation accident, an accidental single nuclear detonation, an act by a solitary terrorist or group, or a nuclear power plant accident or a combination of such incidents. Generic nuclear preparedness activities to respond to the effects of radiation from any of these scenarios would be far more appropriate, realistic, and useful to state and local emergency planners.

IV. It is apparent from the input provided by those invited to participate in this process that the programs are considered an essential element of a community's preparedness capability and one which they all want to retain. It is also obvious that, while nuclear attack is a threat, it is not one upon which most people feel their plans should be based. There seems to be a consensus that plans should be developed and tested that reflect the most immediate or probable threat and that any system established on that basis would, in fact, support response to a crisis of national proportions.

V. The task force supports Governor Goldschmidt's decision not to sign the Comprehensive Cooperative Agreement as currently drafted. The following recommendations related to exercises and the CCA indicate the changes determined to be necessary in order to execute an acceptable agreement with the Federal Emergency Management Agency.

RECOMMENDATIONS:

I. Future Exercises

A. Should address hazards identified by local or state government, as being a primary threat or significant enough to test proposed response procedures.

B. Can include National Security Exercises only if they do not involve multiple nuclear weapons laydown. National security scenarios should be included only insofar as they are indispensable to the testing of a necessary emergency preparedness function. Confrontational or value laden political rhetoric should, at all times, be excluded.

C. Should result in a greater degree of interaction among local jurisdictions as well as between local, state and federal government agencies.

II. Comprehensive Cooperative Agreement

A. The Population Protection Planning Program section should not contain activities which are specifically directed at preparing for events that would result in total nuclear destruction.

1. References to nuclear preparedness planning should be generic in nature and should be applicable to dealing with the affects of radiation regardless of the source.

2. Emphasis should be placed on assisting counties to develop their basic all-hazards plan and supporting functional annexes.

B. The Facility Survey Program section should delete all activities related to conducting overpressure or blast analysis in relation to target aim points as identified in FEMA's NAPB-90 document. There is no reason to assume that the identified target-aim points are of the degree of accuracy on which a major planning effort should be based.

Facility Surveys should include information that is of value to the Red Cross and local government and addresses the shelter needs in relation to hazards that are most likely to occur in Oregon.

C. The Radiological Defense Program section should delete specific references to nuclear attack planning and preparedness that cannot be handled at the state and local level. The Nuclear Attack Hazards Analysis should be revised to reflect a generic approach to a variety of radiological hazards and would be titled Radiological Hazards Survey. It should contain no nuclear warhead target points. It should make reference to other radiological related events such as transportation accidents, solitary terrorists incidents, accidental detonation of a single nuclear device, and nuclear power plant accidents.

III. Congressional Action

Since FEMA may not agree to the changes in the CCA, an immediate formal request should be made during the negotiations , to the Congressional Delegation, to continue to pursue efforts to disallow FEMA from dictating exercise scenarios and the type of hazard to be addressed, or to withhold or limit any funding until Congress has reviewed and modified the current provisions of the Civil Defense Act.

Further, Congress should direct FEMA to structure the program in such a way that it will result in the establishment of a strong emergency preparedness infrastructure at the local and state level.

Finally, it is imperative that the Civil Defense Act be reconstructed to assure that the requirements provide for meeting the emergency and disaster preparedness needs of local and state government as well as addressing national security needs.

Therefore, it is the recommendation of the task force that Governor Goldschmidt petition the Congressional Delegation to pursue the review process agreed to by Congress, and to lead the development of specific legislation that; (1) provides for increased local and state involvement regarding the prioritization of hazard planning and preparedness; (2) specifically emphasizes a program that will address all-hazards; and (3) promotes the concept of establishing and maintaining a strong local and state emergency management infrastructure upon which additional protective measures can be supported in the event of a national security crisis. The petition should request that Congress address the funding issues to assure that adequate funds are appropriated to meet any requirements established by the federal government which local and state government must meet in order to be eligible for the cost sharing programs.

The Task Force further recommends that the Governor direct the Emergency Management Division to explore the feasibility of seeking other available funds from FEMA, unrelated to the Civil Defense Act, which would provide for planning and preparing for natural and technological disasters of the type that are identified as being a real and present threat to Oregonians. Recognizing that this may require legislative approval, the Emergency Management Division should also be directed to prepare any legislative language and budget projections that would, of necessity, be brought before the Legislature.

STATEMENT OF HON. JULIUS W. BECTON, JR., DIRECTOR, FEDERAL EMERGENCY MANAGEMENT AGENCY, ACCOMPANIED BY GRANT PETERSON, ASSOCIATE DIRECTOR, STATE AND LOCAL PROGRAMS AND SUPPORT; AND HON. CRAIG ALDERMAN, DEPUTY UNDER SECRETARY OF DEFENSE FOR POLICY

Director BECTON. Thank you very much, Mr. Chairman. I do appreciate the kind remarks of Senator Thurmond.

We appreciate the opportunity to appear before you and your committee to review the President's fiscal year 1989 request of $160.3 million for a program authorized under the Federal Civil Defense Act of 1950, as amended.

I have with me this morning Mr. Grant Peterson, on my right. He has recently been appointed the Associate Director of State and Local Programs and Support.

I am also accompanied by Mr. Craig Alderman, on my left, the Deputy Under Secretary of Defense for Policy.

As you know, sir, the Defense Department has the oversight responsibility for civil defense and works very closely with FEMA.

Mr. Peterson's directorate is responsible for our civil defense program on a day-to-day basis. We also have other key staff personnel, and if technical questions arise, I would like to rely upon them for a response.

Senator EXON. Certainly.

Director BECTON. You have already accepted, Mr. Chairman, our prepared statement for the record. However, I would like to summarize the main thrust of the fiscal request.

As I have said in the past, I continue to maintain that civil defense is our number one priority. We are proposing a realistic program, both for 1989 and the out-years, to develop a survivable infrastructure of civil defense systems essential to saving lives in the event of nuclear attack, an infrastructure which can also, and does, save lives in natural and technological emergencies which so often occur.

We reported to you in July of 1986 that the U.S. civil defense capabilities were at a low ebb and were continually going down. That situtation has not changed, in large part due to the fact that our existing physical infrastructure of emergency systems lacks the reliability and survivability needed for a catastrophic disaster, including attack.

A major thrust of our 1989 program will, therefore, be to improve the survivability and reliability of existing systems.

Civil defense makes sense to the American people today, just as it has for the past three decades.

My written statement clearly highlights the positive views of the American public based on several surveys. These views are fully supportive of FEMA's dual-use approach. We develop and employ civil defense systems in cooperation with State and local governments, based on their importance to national defense.

Once developed, however, these systems can be used, should be used, and, in fact, are used in peacetime emergencies.

As we have testified previously before the Congress, dual-use of civil defense resources makes sense. It is economical, it saves lives and property in peacetime emergencies, and the use of these systems in real emergencies tests our capabilities and improves their readiness.

The administration's civil defense program is based on National Security Decision Directive (NSDD) 259 on civil defense, approved by the President on February 4 of last year.

Last year, I discussed before the House committee the new emphasis of the National Security Decision Directive 259, which is to develop plans and preparations in peacetime for expanding civil defense by surge actions.

The purpose of a surge strategy is to defer as many costs as feasible to a time of rising tension, as opposed to developing full, standing capabilities in peacetime.

Our objective is to identify and develop a base from which shortfalls could be made good, to the extent that time allowed, by surge actions. To surge civil defense elements will require about 2 to 12 months, with less time needed to improve some elements and more for others.

Some systems, like the national attack warning system, or protection of the stations of the emergency broadcast systems are not surgeable and must be in place. The NSDD stresses the dual-use benefits of civil defense by directing that the program, "continue to support all-hazard, integrated emergency management at State and local levels to the extent that this is consistent with and contributes to the preparedness of the Nation in the event of an attack."

The NSDD also gives priority emphasis to two general areas which have the highest payoff for saving lives in peacetime and attack emergencies.

The first priority is State and local crisis management. This means improving the survivability of State and local governments so that they will be able to support and assist people in an attack emergency, just as they do today in a tornado, a hurricane, or a technological disaster.

To do this, governments must be able to remain in operation so that they can transmit warning, broadcast life-saving information, direct operations, such as rescue, fire-fighting and debris removal, and communicate with other government levels to request or offer help.

The elements I am talking about here include warning systems, protected radio broadcast stations, and emergency operating centers, or EOCs, which are coordination centers with the necessary communications from which civil government directs operations in emergencies of all types.

Our concern is to assure that EOC staffs, who support their people effectively and often in peacetime emergencies, will be able to do the same thing in the event of an attack.

In fiscal year 1988, we will be working with one prototype state to develop a fallout protected EOC capability, including an alternate EOC away from the probable target areas and, in 1989, to extend the program to additional States.

Also essential is to be able to communicate emergency information to people rapidly and reliably. This capability is provided by the emergency broadcast system, which activates stations well over 1,000 times each year from local EOCs to warn and advise people when tornadoes, hurricanes, tsunamis, or any other type of disaster strikes.

We need to assure the ability to communicate to the public any catastrophic disaster, including attack. But at the present time, we cannot give you that assurance. Due to minimal funding of our broadcast station protection program through 1987, we are extremely concerned about the survivability and reliability of these stations.

We will be providing the necessary protection and emergency generators to 10 key entry point stations in 1988, and our request will extend this in 1989 to the remaining 20 entry point stations and to 55 additional relay stations. This will begin to provide a reliable capability.

Warning is another key crisis management requirement. The national attack warning system was established to warn State and local governments of attack, so that they, in turn, can warn their people. This system, which would not exist, except for the attack threat, also has tremendous dual-use benefits in peacetime emergencies.

In a recent 12-month period, the NAWAS, or the National Attack Warning System, was used over 1,600 times to warn State and local governments of tornadoes and other peacetime emergencies.

Additional State and local crisis management capabilities, needed primarily for attack protection, include protection for broadcast stations and emergency operation centers, against the electromagnetic pulse, or EMP, effects of nuclear detonations, as well as a minimum essential system of radiological defense personnel and instruments.

Our 1989 request supports progress in both of these areas. Right now, only 147 existing EOCs, local EOCs, meet all criteria, to assure that they could continue to operate under fallout conditions in an attack emergency. But, with EMP protection, that number will rise to 635.

We will, therefore, give priority to providing EMP protection to these otherwise fully qualified EOCs, starting in 1989. Clearly, this is highly cost effective, since it costs only $12,000 to provide EMP protection to a typical EOC.

The disaster at Chernobyl underlined what we have been stressing for years, that instruments are essential to assess the radiological hazard.

Research and development in 1988 and in prior years has provided the basis for procurement of a limited number of radiological instruments for the crisis management requirements of State and local governments. This has provided the groundwork to allow the development starting in 1989 of a base for mass production during a surge period of the far larger number of instruments which will be needed by the population during the shelter and post-sheltering periods.

We are also providing for training a limited number of radiological defense personnel in peacetime, as well as developing a base for training the more than 1.5 million additional radiological monitors, which would be needed during a surge period.

In sum, our aim in the area of crisis management is to assure that State and local governments will be able to support and advise our people of an attack or a catastrophic peacetime emergency.

The second priority specified by the NSDD is improving population protection capabilities, including emergency planning, as well as information for citizens on what they must do to lessen their chances of injury or death in emergencies of all types.

Action by an informed citizenry is the bedrock foundation of all civil defense programs.

This is also true in countries like Switzerland, Denmark, or even Russia, with a large, in-place program, and even more important, in a program like the one we are proposing.

In an attack emergency, your odds for survival would depend, in great degree, on knowing what to do and taking prompt action. Our people need to know about the blast and fallout effects of nuclear weapons, how existing homes and larger buildings can provide fallout protection, and what to take with them to a shelter.

Most people don't give much thought to such matters in normal times, but when international tensions arise, the public demands survival information.

We saw this phenomenon during the Cuban missile crisis back in 1962. People did not show signs of panic, but they did ask practical questions like where can I find a shelter for myself and my family.

When Afghanistan was invaded, our normal 2-year supply of radiology defense manuals was gone in 30 days, due to the citizens' requests. Although we know that informed action by citizens could save millions of lives in an attack, our present capability to provide attack-related emergency public information is nearly nil.

Our 1989 request, therefore, stresses the development of standby materials to be disseminated by the mass media during a crisis. That the American people want this kind of information available to them was reaffirmed in the 1987 survey mentioned in my prepared text, in which 93 percent of the people said that an extremely important civil defense goal is to provide them information so that they themselves can respond to emergencies.

A related initiative specified in the NSDD is volunteerism, to encourage citizens to help prepare themselves, their families, and their communities, for emergencies of all types, including attack.

Many communities now make good use of volunteers in their civil defense programs and in peacetime disasters, and we believe this activity can, and should, be extended to many more.

Mr. Chairman, these are only the highlights of the civil defense program we are proposing. To sum it up, this is a realistic approach to improve emergency preparedness starting in 1989 at a resource level of $160 million.

If approved, this request will lay the foundation for steady progress in the out-years, a good start in meeting responsibilities of government, as well as the expectations of the American people. It makes sense to the States by striking the right balance between preparedness for a catastrophe we all hope never occurs, that is, a nuclear attack, and the natural and technological disasters which do occur all too often.

It makes sense to the administration, and we hope it makes sense to the Congress as well, and that you will approve our $160.3 million request for 1989.

Mr. Chairman, we will be happy to respond to any questions that you may have, and if necessary, or if you request, Mr. Alderman is also prepared with a short statement.

[The prepared statement of Director Becton follows:]

STATEMENT BY THE HONORABLE JULIUS W. BECTON, JR.

DIRECTOR, FEDERAL EMERGENCY MANAGEMENT AGENCY

MR. CHAIRMAN, I APPRECIATE APPEARING BEFORE YOU TODAY TO REVIEW THE PRESIDENT'S FY 1989 REQUEST OF $160.393 MILLION FOR PROGRAMS AUTHORIZED UNDER THE FEDERAL CIVIL DEFENSE ACT OF 1950, AS AMENDED.

LET ME SUMMARIZE AT THE OUTSET THE MAIN THRUSTS OF OUR 1989 REQUEST. WE PROPOSE A REALISTIC PROGRAM BOTH FOR 1989 AND THE OUT-YEARS--INVOLVING MODEST LEVELS OF RESOURCES WHICH WE CAN REASONABLY EXPECT TO RECEIVE. WE PROPOSE TO DEVELOP A SURVIVABLE INFRASTRUCTURE OF CIVIL DEFENSE SYSTEMS ESSENTIAL TO SAVING LIVES SHOULD THE U.S. EVER EXPERIENCE NUCLEAR ATTACK -- AN INFRASTRUCTURE WHICH ALSO CAN AND DOES SAVE LIVES WEEK BY WEEK IN THE NATURAL AND TECHNOLOGICAL EMERGENCIES WHICH SO OFTEN OCCUR. IN OTHER WORDS, WE STRONGLY SUPPORT THE "DUAL USE" OF SYSTEMS DEVELOPED UNDER THE CIVIL DEFENSE ACT.

WE REPORTED TO THE COMMITTEES ON ARMED SERVICES IN JULY 1986 THAT U.S. CIVIL DEFENSE CAPABILITIES WERE AT A LOW EBB. THAT SITUATION HAS NOT CHANGED, AND IS DUE IN PART TO THE FACT THAT OUR EXISTING PHYSICAL INFRASTRUCTURE OF EMERGENCY SYSTEMS LACKS THE RELIABILITY AND THE SURVIVABILITY NEEDED FOR A CATASTROPHIC DISASTER, INCLUDING ATTACK. A MAJOR THRUST OF OUR 1989 PROGRAM WILL THEREFORE BE TO IMPROVE THE SURVIVABILITY OF EXISTING SYSTEMS, A COST-EFFECTIVE APPROACH.

CIVIL DEFENSE MAKES SENSE TO THE AMERICAN PEOPLE TODAY JUST AS IT HAS FOR THE PAST THREE DECADES. IN 1982, FOR EXAMPLE, THREE SURVEYS CONDUCTED BY THE GALLUP ORGANIZATION SHOWED LARGE MAJORITIES IN FAVOR OF CIVIL DEFENSE--AS WAS ALSO TRUE OF SURVEYS BACK TO THE 1950'S.

A 1987 UNIVERSITY OF PITTSBURGH SURVEY SHOWED THAT THIS STRONG SUPPORT CONTINUES. OVER 85 PERCENT FEEL THAT PROVIDING PROTECTION IN CASE OF NUCLEAR WAR IS AN IMPORTANT GOAL OF CIVIL DEFENSE--AND ALMOST 90 PERCENT

REJECT THE IDEA THAT CIVIL DEFENSE IS NOT NEEDED BECAUSE THERE COULD NEVER BE A NUCLEAR WAR.

THE PEOPLE ARE VERY WELL AWARE THAT A NUCLEAR ATTACK WOULD BE AN UNPARALLELED CATASTROPHE. BUT OVER THREE-QUARTERS OF THOSE SURVEYED AGREE THAT CIVIL DEFENSE COULD SAVE MANY LIVES SHOULD NUCLEAR WAR EVER OCCUR--AND THEY BELIEVE WE SHOULD HAVE CIVIL DEFENSE.

IN SHORT, THE AMERICAN PEOPLE NOW BELIEVE -- AND HAVE BELIEVED FOR MORE THAN THREE DECADES -- THAT NUCLEAR ATTACK IS NOT IMPOSSIBLE AND THAT IF IT SHOULD OCCUR WE WOULD BE BETTER OFF WITH CIVIL DEFENSE THAN WITHOUT IT. THAT, WE BELIEVE, REFLECTS SOUND WISDOM AND COMMON SENSE ON THE PART OF THE PEOPLE -- AND IT IS OUR VIEW AS WELL. I THINK THE VIEWS OF THE PEOPLE REGARDING CIVIL DEFENSE CAN BE SUMMED UP IN ONE WORD, PRUDENCE--THE SAME MOTIVE WHICH LEADS US TO PUT SMOKE DETECTORS IN OUR HOMES, TO USE SEAT BELTS WHEN WE DRIVE, AND TO PAY SCORES OF BILLIONS OF DOLLARS EACH YEAR TO INSURE OURSELVES AGAINST A VARIETY OF RISKS.

ABOUT THREE-QUARTERS OF THOSE SURVEYED SAW THE FEDERAL GOVERNMENT AS HAVING THE MAJOR RESPONSIBILITY FOR ATTACK PREPAREDNESS. WHILE A NUMBER OF THE RESPONDENTS ALSO SAW SUPPORTING ROLES FOR STATE AND LOCAL GOVERNMENTS, AND FOR COMMUNITY VOLUNTEERS, THEY CLEARLY VIEWED THE FEDERAL GOVERNMENT AS HAVING THE KEY ROLE TO PLAY IN DEALING WITH THE HAZARDS OF ATTACK.

INCIDENTALLY, NEARLY THREE-QUARTERS OF THOSE SURVEYED REJECT THE IDEA THAT CIVIL DEFENSE COULD LEAD TO A "FALSE SENSE OF SECURITY," MAKING NUCLEAR WAR MORE ACCEPTABLE. ALSO, THE SURVEY INDICATED THE PEOPLE STRONGLY FAVOR NUCLEAR ARMS REDUCTION AGREEMENTS, AND THEY SEE CIVIL DEFENSE AS NOT BEING IN CONFLICT WITH SUCH AGREEMENTS--VIEWS WHICH WE SHARE, SINCE BOTH CONTRIBUTE TO THE GOAL OF NATIONAL SURVIVAL.

AT THE SAME TIME, THE PEOPLE SEE CIVIL DEFENSE AS EXTREMELY IMPORTANT IN PROVIDING PROTECTION IN CASE OF PEACETIME EMERGENCIES. NEARLY 90 PERCENT FEEL THAT PROTECTING PEOPLE FROM NATURAL AND TECHNOLOGICAL DISASTERS IS AN IMPORTANT GOAL FOR CIVIL DEFENSE.

I THINK IT IS FAIR TO INTERPRET THE FOREGOING VIEWS AS SUPPORTING OUR APPROACH TO THE DUAL-USE ISSUE. WE DEVELOP AND DEPLOY CIVIL DEFENSE SYSTEMS--IN COOPERATION WITH STATE AND LOCAL GOVERNMENTS--BASED UPON THEIR IMPORTANCE TO THE NATIONAL DEFENSE. WE MUST FURTHER ASSURE THAT THEY ARE RELIABLE AND ARE KEPT READY TO FUNCTION IN CASE OF MAJOR DISASTER. ONCE THESE SYSTEMS HAVE BEEN DEVELOPED TO ADDRESS THE ATTACK HAZARD, THEY CAN BE USED--AND THEY SHOULD BE USED, AND THEY ARE USED--IN PEACETIME EMERGENCIES.

THIS MAKES SENSE FROM EVERY STANDPOINT, STARTING WITH ECONOMY AND DUAL USE OF SCARCE TAX DOLLARS. IT SAVES LIVES AND PROPERTY IN THE EMERGENCIES WHICH THREATEN SOME OF OUR PEOPLE, IN SOME JURISDICTIONS, NEARLY EVERY WEEK. AND USING CIVIL DEFENSE SYSTEMS IN REAL EMERGENCIES STRESSES AND EXERCISES THOSE SYSTEMS AND STAFFS, IMPROVING THEIR READINESS.

THERE IS, IN FACT, A GREAT COMMUNITY OF INTEREST BETWEEN THE FEDERAL GOVERNMENT AND STATE AND LOCAL GOVERNMENTS--ONE WHICH IS MUCH LARGER THAN ONE MIGHT CONCLUDE FROM THOSE INFREQUENT OCCASIONS WHEN THE DUAL-USE ISSUE BREAKS INTO THE NEWS. THIS RESULTS FROM THE FACT THAT MOST ELEMENTS OF THE CIVIL DEFENSE PROGRAM PRODUCE CAPABILITIES WHICH ARE NEEDED FOR PEACETIME AND ATTACK-CAUSED DISASTERS ALIKE. THESE INCLUDE THE NATIONAL WARNING SYSTEM, STATE AND LOCAL WARNING AND COMMUNICATIONS SYSTEMS, EMERGENCY OPERATING CENTERS FROM WHICH LOCAL AND STATE STAFFS DIRECT LIFESAVING OPERATIONS, PROTECTED STATIONS OF THE EMERGENCY BROADCAST SYSTEM THROUGH WHICH KEY OFFICIALS PROVIDE ADVICE TO THE PEOPLE IN EMERGENCIES OF ALL KINDS, AND THE MATCHING FUNDS WHICH SUPPORT NEARLY 6,800 STATE AND LOCAL EMERGENCY MANAGEMENT PERSONNEL IN SOME 2,700 JURISDICTIONS THROUGHOUT THE COUNTRY.

I THINK THE CURRENT PROGRAM EMBODIES A BALANCE WHICH IS ACCEPTABLE AND BENEFICIAL TO ALL PARTIES. OUR PRIMARY CONCERN IS TO DEVELOP CAPABILITIES WHICH ARE RELIABLE AND WHICH CAN SAVE LIVES IN THE EVENT OF NUCLEAR ATTACK. IN A NUMBER OF CASES THIS MEANS PROVIDING ATTACK EFFECTS PROTECTION FOR THE INFRASTRUCTURE SYSTEMS WHICH ARE USED ALL THE TIME IN PEACETIME EMERGENCIES, BUT WHICH LACK ATTACK SURVIVABILITY. OF COURSE WE TAKE CARE TO DESIGN AND DEPLOY THE ELEMENTS OF THE PROGRAM SO THAT--IN THE LANGUAGE OF THE 1980 AMENDMENTS TO THE ACT--THEY ARE INSOFAR AS POSSIBLE "...ADAPTABLE TO HELP DEAL WITH NATURAL DISASTERS AND OTHER PEACETIME EMERGENCIES."

THAT THE STATES ARE IN ACCORD WITH THIS APPROACH IS SHOWN, I BELIEVE, BY THE FACT THAT ALL STATES HAVE SIGNED FY 1988 COMPREHENSIVE COOPERATIVE AGREEMENTS. THESE STRESS IMPROVING ATTACK PREPAREDNESS WHILE RECOGNIZING THAT THE SYSTEMS DEVELOPED UNDER THE CIVIL DEFENSE PROGRAM ARE ALSO OF GREAT VALUE IN PEACETIME EMERGENCIES.

LET ME TURN NOW TO THE PROGRAM WE ARE PROPOSING TO IMPROVE EMERGENCY PREPAREDNESS THROUGHOUT THE COUNTRY. AS I OUTLINE OUR 1989 REQUEST, I WILL POINT OUT THE DUAL-USE APPLICATION OF MOST OF THE SYSTEMS AND CAPABILITIES IN PEACETIME DISASTERS, AND ALSO WHAT MUST BE DONE TO IMPROVE THEIR SURVIVABILITY SO THEY CAN CONTINUE TO FUNCTION IN THE EVENT OF AN ATTACK OR CATASTROPHIC DISASTER.

THE ADMINSTRATION'S CIVIL DEFENSE PROGRAM IS BASED ON NATIONAL SECURITY DECISION DIRECTIVE 259 ON CIVIL DEFENSE, APPROVED BY THE PRESIDENT ON FEBRUARY 4, 1987. A NEW EMPHASIS IN NSDD 259 IS TO DEVELOP PLANS AND PREPARATIONS IN PEACETIME FOR EXPANDING CIVIL DEFENSE BY "SURGE" ACTIONS IN TIME OF INCREASING INTERNATIONAL TENSION. THE PURPOSE OF THIS IS TO DEFER AS MANY COSTS AS REASONABLE TO A TIME OF RISING TENSION, AS OPPOSED TO DEVELOPING FULL IN-BEING CAPABILITIES IN PEACETIME. WE WILL THEREFORE DEVELOP A BASE FROM WHICH SHORTFALLS COULD BE MADE GOOD, TO THE MAXIMUM EXTENT THAT TIME ALLOWED, BY SURGE ACTIONS.

A CIVIL DEFENSE SURGE WOULD REQUIRE PERHAPS TWO TO TWELVE MONTHS, LESS FOR SOME CAPABILITIES AND SYSTEMS, MORE FOR OTHERS. SOME SYSTEMS, OF COURSE, ARE NOT SURGEABLE AND MUST BE IN PLACE, SUCH AS THE NATIONAL ATTACK WARNING SYSTEM OR PROTECTED STATIONS OF THE EMERGENCY BROADCAST SYSTEM. THESE ALSO CONTRIBUTE TO THE PROTECTION OF THE PEOPLE IN PEACETIME DISASTERS.

NSDD 259 STRESSES THE DUAL-USE BENEFITS OF CIVIL DEFENSE BY DIRECTING THAT THE PROGRAM "...CONTINUE TO SUPPORT ALL-HAZARD INTEGRATED EMERGENCY MANAGEMENT AT STATE AND LOCAL LEVELS, TO THE EXTENT THAT THIS IS CONSISTENT WITH AND CONTRIBUTES TO PREPAREDNESS OF THE NATION IN THE EVENT OF AN ATTACK...." THE NSDD'S EMPHASIS INCLUDES TWO GENERAL AREAS WHICH HAVE SUBSTANTIAL POTENTIAL FOR SAVING LIVES IN BOTH PEACETIME AND ATTACK EMERGENCIES, COMBINED WITH MINIMUM EXPENDITURE REQUIREMENTS.

THE FIRST PRIORITY AREA IS STATE AND LOCAL CRISIS MANAGEMENT. THIS MEANS IMPROVING THE SURVIVABILITY OF OUR CONSTITUTIONAL FABRIC OF GOVERNMENT, INCLUDING THE ABILITY TO COMMUNICATE AMONG GOVERNMENTS AND TO THE PUBLIC IN EMERGENCIES OF ALL KINDS. THE PURPOSE OF THIS EMPHASIS, IN SIMPLEST TERMS, IS TO PUT GOVERNMENTS IN POSITION TO SUPPORT AND ASSIST THEIR PEOPLE IN AN ATTACK EMERGENCY JUST AS THEY DO TODAY IN A TORNADO, A HURRICANE, OR A TECHNOLOGICAL DISASTER. TO DO THIS, GOVERNMENTS MUST BE ABLE TO REMAIN IN OPERATION SO THEY CAN WARN THEIR PEOPLE; BROADCAST LIFESAVING INFORMATION TO THEM; DIRECT OPERATIONS SUCH AS RESCUE, FIREFIGHTING AND DEBRIS REMOVAL; AND COMMUNICATE TO HIGHER LEVELS TO REQUEST HELP. MAJOR PROGRAM ELEMENTS INVOLVED INCLUDE WARNING SYSTEMS, PROTECTED RADIO BROADCAST STATIONS, AND EMERGENCY OPERATING CENTERS OR EOC'S.

THE EOC'S ARE COORDINATION CENTERS, WITH THE NECESSARY COMMUNICATIONS, FROM WHICH CIVIL GOVERNMENTS DIRECT OPERATIONS IN EMERGENCIES OF ALL TYPES. THE DAY-TO-DAY OPERATIONS OF A LOCAL FIRE DEPARTMENT ARE USUALLY DIRECTED FROM THE CENTRAL FIRE STATION, THOSE OF THE POLICE DEPARTMENT FROM THE POLICE STATION, AND SO ON. SUPPORTING THE PEOPLE IN A DISASTER, HOWEVER, REQUIRES MORE COORDINATION BETWEEN ALL ELEMENTS OF CIVIL GOVERNMENT THAN IS NEEDED IN NORMAL TIMES.

EXPERIENCE SHOWS THAT KEY OFFICIALS AND THEIR STAFFS MUST BE CO-LOCATED IN A SURVIVABLE EMERGENCY OPERATING CENTER WITH COMMUNICATIONS TO FIELD UNITS, TO NEIGHBORING JURISDICTIONS, AND TO HIGHER LEVELS OF GOVERNMENT. THERE MUST ALSO BE COMMUNICATIONS TO THE EMERGENCY BROADCAST SYSTEM, SO ADVICE CAN BE GIVEN TO THE PEOPLE. THE USE OF EMERGENCY OPERATING CENTERS

BY LOCAL AND STATE GOVERNMENTS IS ROUTINE IN TORNADOES, HURRICANES, AND HAZARDOUS MATERIALS SPILLS, AND THEIR STAFFS ARE COMPOSED OF EMERGENCY PROFESSIONALS SUCH AS FIRE AND POLICE CHIEFS, HEALTH OFFICERS, AND COMMUNICATIONS TECHNICIANS AND DISPATCHERS. TO COORDINATE OPERATIONS IN A DISASTER, THESE PEOPLE MUST WORK IN A SINGLE FACILITY, THE EOC, RATHER THAN IN THEIR SEPARATE HEADQUARTERS AS THEY DO IN NORMAL TIMES.

OUR CONCERN IS TO ASSURE THAT EOC STAFFS, WHO SUPPORT THEIR PEOPLE EFFECTIVELY AND OFTEN IN PEACETIME EMERGENCIES, COULD DO SO AS WELL IN EVENT OF ATTACK--WHICH MEANS ASSURING SURVIVABILITY. TO THIS END, IN FY 1988 WE SHALL BE WORKING WITH ONE PROTOTYPE STATE TO DEVELOP A FALLOUT-PROTECTED EOC CAPABILITY, INCLUDING AN ALTERNATE EOC AWAY FROM PROBABLE TARGET AREAS. IN 1989 WE INTEND TO EXTEND THE PROGRAM TO ADDITIONAL STATES, BUILDING UPON OUR EXPERIENCE WITH THE 1988 PROTOTYPE. WE SHALL BE SEEKING LOWEST-COST OPPORTUNITIES; FOR EXAMPLE, BY DEVELOPING ALTERNATE EOC'S IN EXISTING STRUCTURES.

A FURTHER ESSENTIAL IN PROVIDING FOR THE SAFETY OF THE PEOPLE IS TO BE ABLE TO COMMUNICATE EMERGENCY ADVICE TO THEM RAPIDLY AND RELIABLY. THIS CAPABILITY IS PROVIDED BY THE EMERGENCY BROADCAST SYSTEM. RADIO STATIONS OF THIS SYSTEM ARE ACTIVATED WELL OVER 1,000 TIMES EACH YEAR FROM LOCAL EMERGENCY OPERATING CENTERS TO WARN THE PEOPLE AND TELL THEM WHAT THEY SHOULD DO TO PROTECT THEMSELVES FROM TORNADOES, HURRICANES AND CHEMICAL THREATS.

IT IS OBVIOUSLY OF EVEN GREATER IMPORTANCE THAT EBS STATIONS BE ABLE TO PROVIDE THE SAME KIND OF ADVICE TO THE PEOPLE IN A CATASTROPHE. WE WANT TO ASSURE THE ABILITY TO COMMUNICATE TO THE PUBLIC IN ANY CATASTROPHIC DISASTER, INCLUDING ATTACK, BUT AT THE PRESENT TIME WE CANNOT GIVE THEM THAT ASSURANCE. DUE TO MINIMAL FUNDING OF OUR BROADCAST STATION PROTECTION PROGRAM THROUGH 1987, WE ARE EXTREMELY CONCERNED ABOUT THE SURVIVABILITY AND RELIABILITY OF THOSE STATIONS. WE WILL BE PROVIDING THE NECESSARY PROTECTION AND EMERGENCY GENERATORS TO 10 KEY ENTRY-POINT STATIONS IN 1988 AND OUR REQUEST WILL EXTEND THIS IN 1989 TO THE REMAINING 20 ENTRY-POINT STATIONS

AND TO 55 ADDITIONAL RELAY STATIONS. THIS WILL BEGIN TO PROVIDE A RELIABLE CAPABILITY TO GET EMERGENCY INFORMATION AND ADVICE TO OUR POPULATION IN TIME OF CATASTROPHIC DISASTER.

WARNING IS ANOTHER KEY INGREDIENT OF CRISIS MANAGEMENT. THE NATIONAL ATTACK WARNING SYSTEM--OR NAWAS--WAS ESTABLISHED, AS ITS NAME REFLECTS, TO WARN STATE AND LOCAL GOVERNMENTS OF AN ATTACK UPON THE UNITED STATES SO THEY CAN IN TURN WARN THEIR PEOPLE. BUT THIS SYSTEM, WHICH WOULD NOT EXIST BUT FOR THE ATTACK THREAT, HAS TREMENDOUS DUAL-USE BENEFITS IN PEACETIME EMERGENCIES. IN A RECENT 12-MONTH PERIOD, NAWAS WAS USED OVER 1,600 TIMES TO WARN STATE AND LOCAL GOVERNMENTS OF TORNADOES AND OTHER PEACETIME THREATS AND EMERGENCIES.

STATE AND LOCAL WARNING SYSTEMS ARE USED TO PASS ON TO THE PEOPLE THE WARNING PROVIDED BY NAWAS. OUR 1989 REQUEST THUS INCLUDES A SUBSTANTIAL INCREASE IN MATCHING FUNDS TO KEEP EXISTING STATE AND LOCAL DIRECTION, CONTROL AND WARNING EQUIPMENT OPERATIONAL.

THERE ARE ADDITIONAL ELEMENTS OF STATE AND LOCAL CRISIS MANAGEMENT CAPABILITIES WHICH--THOUGH NOT WITHOUT APPLICATION IN PEACETIME DISASTERS--ARE NEEDED PRIMARILY FOR ATTACK PROTECTION. THESE INCLUDE PROTECTION FOR BROADCAST STATIONS AND FOR EMERGENCY OPERATING CENTERS AGAINST THE ELECTROMAGNETIC PULSE EFFECTS OF NUCLEAR DETONATIONS, AS WELL AS A MINIMUM-ESSENTIAL SYSTEM OF RADIOLOGICAL DEFENSE PERSONNEL AND INSTRUMENTS TO ASSESS THE FALLOUT HAZARD CREATED BY AN ATTACK, AS A BASIS FOR BROADCASTING ADVICE TO THE PEOPLE ON SHELTER PROTECTION.

OUR 1989 REQUEST WILL SUPPORT PROGRESS IN BOTH OF THESE AREAS. PROTECTION FOR EMERGENCY BROADCAST SYSTEM STATIONS WILL INCLUDE PROTECTION AGAINST ELECTROMAGNETIC PULSE, OR EMP. AS FOR EMERGENCY OPERATING CENTERS, ONLY 147 EXISTING LOCAL EOC'S MEET ALL CRITERIA TO ASSURE THAT THEY COULD CONTINUE TO OPERATE UNDER FALLOUT CONDITIONS IN AN ATTACK EMERGENCY. HOWEVER, THERE ARE 488 MORE WHICH LACK ONLY EMP PROTECTION.

WE WILL THEREFORE GIVE PRIORITY TO PROVIDING EMP PROTECTION TO THESE OTHERWISE FULLY QUALIFIED EOC'S, STARTING IN 1989, SINCE BY DOING THIS WE

WILL MORE THAN QUADRUPLE THE NUMBER OF LOCAL EOC'S ABLE TO CONTINUE OPERATIONS TO SUPPORT THEIR PEOPLE UNDER FALLOUT CONDITIONS. THIS IS A HIGHLY COST-EFFECTIVE ENDEAVOR, SINCE IT COSTS ONLY SOME $12,000 TO PROVIDE EMP PROTECTION TO A TYPICAL EOC. IT ALSO REFLECTS THE EMPHASIS I MENTIONED EARLIER, TO APPLY 1989 FUNDS TO IMPROVING THE ATTACK SURVIVABILITY OF FACILITIES AND SYSTEMS WHICH ARE NEEDED AND USED FREQUENTLY IN PEACETIME DISASTERS BUT WHICH CANNOT NOW BE RELIED UPON TO OPERATE UNDER ATTACK CONDITIONS.

THE DISASTER AT CHERNOBYL UNDERLINED WHAT WE HAVE BEEN STRESSING FOR YEARS--INSTRUMENTS ARE ESSENTIAL TO ASSESS A RADIOLOGICAL HAZARD, WHICH CAN BE DETECTED BY NONE OF THE HUMAN SENSES. RESEARCH AND DEVELOPMENT IN 1988 AND PRIOR YEARS HAS PROVIDED THE BASIS FOR PROCUREMENT OF A LIMITED NUMBER OF RADIOLOGICAL INSTRUMENTS FOR THE CRISIS MANAGEMENT REQUIREMENTS OF STATE AND LOCAL GOVERNMENTS. THIS WILL IN TURN ALLOW THE DEVELOPMENT, STARTING IN 1989, OF A BASE FOR MASS PRODUCTION DURING A SURGE PERIOD OF THE FAR LARGER NUMBER OF INSTRUMENTS WHICH WOULD BE NEEDED BY THE POPULATION DURING THE SHELTER AND POST-SHELTER PERIODS, SHOULD AN ATTACK OCCUR. OUR TRAINING PROGRAM SIMILARLY PROVIDES FOR TRAINING A LIMITED NUMBER OF RADIOLOGICAL DEFENSE PERSONNEL IN PEACETIME PLUS DEVELOPING A BASE FOR TRAINING OVER 1.5 MILLION ADDITIONAL RADIOLOGICAL MONITORS DURING A SURGE PERIOD.

IN SUM, OUR AIM IN THE AREA OF CRISIS MANAGEMENT IS TO PUT STATE AND LOCAL GOVERNMENTS IN POSITION TO SUPPORT AND ADVISE THEIR PEOPLE IN AN ATTACK EMERGENCY AND TO ENHANCE THEIR CAPABILITIES IN THE AREA OF NATURAL AND TECHNOLOGICAL DISASTERS. THEY MUST BE ABLE TO DIRECT EMERGENCY OPERATIONS--ALSO TO BROADCAST LIFESAVING ADVICE TO THE PEOPLE ON HOW TO MAKE BEST USE OF THE LARGE AMOUNT OF FALLOUT PROTECTION IN EXISTING HOMES AND LARGER BUILDINGS, WHEN THEY CAN LEAVE SHELTERS AS FALLOUT INTENSITIES DECLINE, AND WHERE FOOD, WATER AND OTHER ESSENTIALS ARE AVAILABLE. FINALLY, SUCCESSFUL FEDERAL OPERATIONS FOR THE CONTINUITY OF CIVIL GOVERNMENT REQUIRE A CORRESPONDING CAPABILITY AT THE STATE AND LOCAL LEVELS.

THE SECOND PRIORITY AREA SPECIFIED BY NSDD 259 IS IMPROVING POPULATION PROTECTION CAPABILITIES, INCLUDING EMERGENCY PLANNING AS WELL AS INFORMATION FOR CITIZENS ON PRACTICAL THINGS THEY CAN DO TO AVOID INJURY OR DEATH IN EMERGENCIES OF ALL TYPES. ACTION BY AN INFORMED CITIZENRY IS THE BEDROCK FOUNDATION OF ANY PROTECTION PROGRAM, AND THIS APPLIES IN THE CASE OF NUCLEAR ATTACK AS IT DOES TO TORNADOES, HURRICANES AND OTHER PEACETIME EMERGENCIES. THIS TRUTH IS RECOGNIZED IN COUNTRIES SUCH AS SWITZERLAND, DENMARK OR THE USSR WITH LARGE IN-PLACE PROGRAMS, BUT WHICH STILL PUT GREAT STRESS ON TRAINING AND INFORMATION FOR THEIR PEOPLE. AND INFORMED CITIZEN ACTION ASSUMES EVEN GREATER IMPORTANCE IN A PROGRAM SUCH AS WE PROPOSE.

WHAT WE ARE TALKING ABOUT MORE CONCRETELY IS INFORMATION ON WHAT PEOPLE CAN DO TO INCREASE THEIR ODDS FOR SURVIVAL IF THEY ARE THREATENED BY TORNADOES, HURRICANES, OR ATTACK. TO ILLUSTRATE WITH A PEACETIME DISASTER, IF A TORNADO THREATENS A TOWN, THE LOCAL GOVERNMENT SHOULD HAVE A WARNING SYSTEM TO ALERT THE PEOPLE TO THE APPROACHING DANGER. BUT WHETHER A GIVEN INDIVIDUAL SURVIVES OR DIES DEPENDS CRITICALLY UPON WHAT HE OR SHE DOES AFTER BEING WARNED--AND THIS DEPENDS ON KNOWING WHAT TO DO. A PERSON WHO HAS GONE TO THE BASEMENT OF A HOUSE STRUCK BY A TORNADO HAS GOOD ODDS FOR ESCAPING INJURY--BUT ONE WHO REMAINS UPSTAIRS HAS ALL TOO HIGH A CHANCE FOR INJURY OR DEATH.

IN AN ATTACK EMERGENCY TOO, A PERSON'S ODDS FOR SURVIVAL WOULD DEPEND IN GREAT DEGREE ON KNOWING WHAT TO DO AND TAKING PROMPT ACTION. PEOPLE WOULD NEED TO KNOW ABOUT SUCH THINGS AS THE FALLOUT EFFECTS OF NUCLEAR WEAPONS, HOW EXISTING HOMES AND LARGER BUILDINGS CAN PROVIDE FALLOUT PROTECTION, AND WHAT TO TAKE TO A SHELTER.

THEREFORE, A KEY AIM IS FOR STATE AND LOCAL GOVERNMENTS TO BE ABLE TO LET THEIR PEOPLE KNOW IN TIME OF CRISIS WHERE EXISTING SHELTER CAN BE FOUND, AND HOW TO IMPROVE IT WHERE NECESSARY. MOST PEOPLE DO NOT GIVE MUCH THOUGHT TO SUCH MATTERS IN NORMAL TIMES--BUT WHEN INTERNATIONAL TENSIONS RISE, SO DOES PUBLIC DEMAND FOR SURVIVAL INFORMATION.

WE SAW THIS PHENOMENON DURING THE CUBAN MISSILE CRISIS IN 1962. CONTRARY TO SOME PERCEPTIONS, THE PEOPLE DID NOT SHOW SIGNS OF "PANIC." RATHER, THEY ASKED PRACTICAL AND DOWN-TO-EARTH QUESTIONS SUCH AS "WHERE CAN I FIND A SHELTER FOR MYSELF AND MY FAMILY?" WHEN AFGHANISTAN WAS INVADED WE STARTED GETTING REQUESTS FOR SURVIVAL INFORMATION -- AND A NORMAL TWO-YEAR SUPPLY OF RADIOLOGICAL DEFENSE MANUALS WAS GONE IN 30 DAYS.

INFORMED ACTION BY CITIZENS COULD SAVE MILLIONS OF LIVES IN AN ATTACK EMERGENCY--BY MAKING USE OF PROTECTION WHICH NOW EXISTS IN LARGER BUILDINGS AND IN HOMES. BUT OUR PRESENT CAPABILITY TO PROVIDE THE NECESSARY INFORMATION TO THE PEOPLE IS NEARLY NIL.

OUR 1989 REQUEST THUS PROVIDES FOR AN EXPANDED EFFORT TO PROVIDE INFORMATION FOR THE PEOPLE ON THREATS, INCLUDING NUCLEAR ATTACK, WHICH MAY AFFECT THEIR LOCALITIES AND ON ACTIONS THEY CAN TAKE TO IMPROVE THEIR ODDS FOR SURVIVAL. WE INTEND TO STRESS THE DEVELOPMENT OF STANDBY MATERIALS TO BE DISSEMINATED BY THE MASS MEDIA SHOULD A CRISIS ARISE AND ESCALATE--THE TIME WHEN EXPERIENCE SHOWS THE PEOPLE SEEK SURVIVAL INFORMATION.

SURVEYS INDICATE THAT THE AMERICAN PEOPLE ARE OVERWHELMINGLY IN FAVOR OF THIS EMPHASIS ON GETTING SURVIVAL INFORMATION TO THEM. IN THE 1987 SURVEY I MENTIONED EARLIER, 93 PERCENT OF THE PEOPLE FELT THAT AN EXTREMELY IMPORTANT CIVIL DEFENSE GOAL IS TO PROVIDE INFORMATION SO PEOPLE CAN HELP THEMSELVES RESPOND TO EMERGENCIES. THIS TELLS ME WE ARE ON THE RIGHT TRACK WITH THIS COMMON-SENSE PROPOSAL.

A RELATED INITIATIVE SPECIFIED BY NSDD 259 IS VOLUNTEERISM--TO ENCOURAGE CITIZENS TO HELP PREPARE THEMSELVES, THEIR FAMILIES, AND THEIR COMMUNITIES FOR EMERGENCIES OF ALL TYPES, INCLUDING ATTACK. MANY COMMUNITIES NOW MAKE GOOD USE OF VOLUNTEERS IN THEIR CIVIL DEFENSE PROGRAMS AND IN PEACETIME DISASTERS, AND WE BELIEVE THIS CAN AND SHOULD BE EXTENDED TO MANY MORE.

THIS TOO IS SUPPORTED BY THE PUBLIC. WHEN ASKED TO RATE THE IDEA OF SELF-HELP GROUPS FOR EMERGENCY PREPAREDNESS, ABOUT THREE-QUARTERS THOUGHT THIS WAS A GOOD IDEA. REGARDING VOLUNTARY PARTICIPATION IN CIVIL DEFENSE, ABOUT

THREE-QUARTERS SAID THAT IF COURSES WERE AVAILABLE THEY WOULD BE WILLING TO TAKE TRAINING IN CIVIL DEFENSE SUBJECTS, ALSO THAT THEY WOULD VOLUNTEER TO PARTICIPATE IN A COMMUNITY PREPAREDNESS PROGRAM.

I HAVE TRIED IN THESE REMARKS TO TOUCH ON THE HIGHLIGHTS OF THE CIVIL DEFENSE PROGRAM WE ARE PROPOSING. IT IS ONE WHICH WILL PUT US ON THE ROAD TO SUBSTANTIALLY BETTER PREPAREDNESS FOR ATTACK AND PEACETIME EMERGENCIES ALIKE. SOME ADDITIONAL DETAILS APPEAR IN TAB "A" ATTACHED, INCLUDING THE WAYS IN WHICH THE 1989 BUDGET IS STRUCTURED TO REFLECT THE NSDD 259 EMPHASES.

TO SUM UP, WE PROPOSE A REALISTIC PROGRAM TO IMPROVE EMERGENCY PREPAREDNESS STARTING IN 1989, AT A RESOURCE LEVEL OF $160 MILLION. IF APPROVED, THIS REQUEST WILL LAY THE FOUNDATION FOR STEADY PROGRESS IN THE OUTYEARS.

THE PROGRAM WE ARE PROPOSING WILL BEGIN TO MEET THE RESPONSIBILITIES OF GOVERNMENT AS WELL AS THE EXPECTATIONS OF THE AMERICAN PEOPLE. IT MAKES SENSE TO THE STATES BY STRIKING THE RIGHT BALANCE BETWEEN PREPAREDNESS FOR A CATASTROPHE WE ALL HOPE WILL NEVER OCCUR, NUCLEAR ATTACK, AND THE NATURAL AND TECHNOLOGICAL DISASTERS WHICH DO OCCUR ALL TOO OFTEN. IT MAKES SENSE TO THE ADMINISTRATION. I HOPE IT WILL MAKE SENSE TO YOU AS WELL, AND THAT YOU WILL APPROVE OUR $160.393 MILLION REQUEST FOR 1989.

MR. CHAIRMAN, I WOULD BE HAPPY TO REPOND TO ANY QUESTIONS YOU AND OTHER SUBCOMMITTEE MEMBERS MAY HAVE.

TAB "A"

HIGHLIGHTS OF FY 1989 CIVIL DEFENSE PROGRAM

The 1989 request totals $160,393,000, and begins improvements in the directions specified in the new National Security Decision Directive on civil defense (NSDD 259) approved by the President on February 4, 1987. The revised program supports the State and local emergency management infrastructure, while developing a base from which capabilities could be improved by "surge" actions in time of increasing international tension and focusing priority on improvements in: (1) State and local crisis management capabilities to support the population in emergencies by providing lifesaving advice on protection from fallout and where food and other essentials are available and by directing lifesaving operations; (2) population protection, including information for citizens on actions to avoid death or injury in emergencies of all types; (3) encouraging and supporting volunteerism by citizens in emergency preparedness; and (4) developing life support plans to provide food, water, and other essentials to sustain survivors.

State and Local Emergency Management: ($58.275M) An increase of $2.850M over FY 1988. Assists in supporting State and local emergency staffs of some 6,800 in 2,680 jurisdictions. Increases the number of military reservists supporting State and local governments to 675 (vs. approximately 450 now funded).

Radiological Defense: ($13.767M) An increase of $4.542M over FY 1988. Supports 52 State Radiological Defense Officers. Supports staffs in 50 States (132 workyears) to maintain and calibrate radiological instruments. Begins developing a base for "surge" production of instruments in time of increasing international tension.

Population Protection: ($14.293M) An increase of $2.900M over FY 1988. Supports approximately 190 State-level planners to assist local staffs in developing emergency plans. Supports shelter surveys in the States and adds summer-hire college students trained as Shelter Survey Technicians to reduce per-building average costs. Initiates volunteerism and life support activities noted above.

State and Local Direction, Control and Warning: ($10.793M) An increase of $6.923M over FY 1988. Provides $5.000M to develop State and State alternate fallout protected Emergency Operating Centers, taking advantage of lowest cost opportunities. Upgrades approximately 75 Emergency Broadcast System stations (backup generators, etc.), to provide information and advice to the public in time of emergency. Also supports State and local warning and communications systems and provides electromagnetic pulse (EMP) protection.

Research: ($0.900M) An increase of $0.600M over FY 1988. Develops plans for "surge" improvement of civil defense capabilities in time of escalating tensions.

Training and Education: ($12.453M) An increase of $3.315M over FY 1988. Continues training at the National Emergency Training Center and in the States. Develops emergency public information materials for use in peacetime or in time of escalating international tension. Develops "surge" training deployment plans.

Telecommunications & Warning: ($21.675M) An increase of $4.798M over FY 1988. Continues current warning and communications programs. Substantially completes procurement of high-frequency radios begun in FY 1984, to link the States, national and regional locations, providing radios for States and regional locations still lacking this equipment.

Salaries and Expenses. ($28.255M) An increase of $0.893M over FY 1988. Continues FY 1988 Federal staffing; no additional workyears are requested.

Senator EXON. Thank you very much, Mr. Becton. We appreciate your very comprehensive statement, and we have accepted your full statement for the record.

Did you say that one of your aides would like to make a statement?

Director BECTON. Mr. Alderman is not quite my aide. He is a good man for the Department of Defense, sir. He is the Deputy Under Secretary of Defense for Policy.

Senator EXON. We are happy to hear from you at this time, sir.

STATEMENT OF HON. CRAIG ALDERMAN, DEPUTY UNDER SECRETARY OF DEFENSE FOR POLICY

Mr. ALDERMAN. Mr. Chairman, I could make a statement in about four sentences.

I appreciate the opportunity to appear in front of this committee on behalf of the Federal Emergency Management Agency's proposed civil defense program for fiscal year 1989.

As in previous years, I can assure you that this program has the endorsement and full support of the Department of Defense.

Our reports to the respective committee chairmen, which were submitted on March 8 of this year, restate our thinking on the overall program and our specific improvements and needs.

Our oversight is exercised by direction of the President for two purposes: one, to assure that civil defense planning continues to be fully compatible with the Nation's overall strategic policy; and, second, that the legitimate needs of national security not be unintentionally subordinated to disaster relief in that programming.

We, in the Department of Defense, are satisfied that both of those conditions are met in the requested budget and the program that that budget supports for fiscal year 1989.

As the Director, I would be glad to answer any specific questions you may have, sir.

Senator EXON. Gentlemen, thank you very much.

You are looking at two individuals who were former Governors of their States—South Carolina, in the case of my friend and colleague, Senator Thurmond, and Nebraska in my own case. So, as former Governors, we had a very good working relationship with FEMA during the natural disasters, that struck our States, as happens at one time or another.

FEMA was just outstanding on several occasions that I can think of. I just want publicly to recognize the organization for the good job that it did, I think, more than anything else, where an arm of the Federal Government is available for consultation, it not only helps the local officials, with whom you work very closely, but it reassures the citizens who have to recover very quickly from sudden shock, totally unexpected, to know that there are agencies of the Federal and local governments that are there to care and help. I think, more than anything else, that is an important role that you play.

Director BECTON. Thank you, Mr. Chairman.

Senator EXON. I just want to say that, given the budget constraints that we have, the sizable increase in the budget is one that is going to receive extreme scrutiny. Although I think you made a pretty good case for it this morning, I must say that I would guess that the 20-percent increase from last year's authorization for fiscal year 1989 is probably the largest increase of any elements of the defense budget.

I would suggest that we are going to have some difficulty in holding that.

You indicated, Mr. Becton, in your statement that communications was a very important factor. I would certainly agree, although I am not sure that I fully understand that because, even now, I hear quite frequently interruptions of radio stations, both here and back home in Nebraska, with those test announcements that we have been used to now for 30 or 40 years. It seems to me that that is a very effective way at least one-way communication to tell the people what is going on and what they can do.

When you talk about communications, I assume that you are talking about more sophisticated two-way communications, when the normal power structures break down, is that correct?

Director BECTON. That is correct, sir, but we are also talking about the protection of emergency broadcast stations so that those stations can stay on board, that is, stay on the air during an attack.

I would like to turn to Mr. Peterson so that he may respond in greater detail to that question.

Mr. PETERSON. Thank you very much.

It is an honor to be before you this morning.

EMERGENCY BROADCAST SYSTEM

The Emergency Broadcast System is one of the backbones of protection for the citizens of the United States for the very astute reason that you have just said to us today, that the people hear a tone periodically, they assume that the Federal Government is on the job, that they have a system that will work during an emergency, whether it is a major natural or technological catastrophe or a nuclear attack.

The funding level in the Emergency Broadcast System over the last number of years has caused a substantial degradation, not only in the systems that are already there, but has literally stopped any further improvement of the reliability of the Emergency Broadcast System.

As an example, sir, in 1987, the U.S. Government spent $30,000 on the national Emergency Broadcast System. Concerning the Emergency Broadcast System, at the present time, under a major catastrophic event or a nuclear attack, taking into account the requirements for survivability and reliability, I can give you no statement of confidence today, in this committee, that the emergency broadcast system, under those catastrophic events, would be either survivable or reliable, sir.

Our increase is based on a concentrated, thoughtful process to bring the Emergency Broadcast System over a number of years back into the reliability category.

That is only one element of communication, of course.

Senator EXON. Have you modernized your plans and programs with regard to "emergency" broadcast services from the days when our whole civil defense program was based upon no or extremely limited warning of a possible nuclear attack?

I am sure you are familiar with the fact that most of our military planning today, while recognizing the "bolt out of the blue" attack can always take place, has changed rather dramatically from what it was in the 1950s and 1960s.

How has that changed your plans? Is that reflected in the budget?

It would seem to me that if we had hours or days of warning, as we are very likely to have, of any attack, that would make your job of communications easier than it was under the scenario where you would have a few minutes, if any, warning.

Director **Becton**. Mr. Chairman, you are absolutely correct.

We certainly hope that, if we have an attack, we get the kind of warning that you have talked about, and we would get it from the military.

I have a cell of certain people at NORAD who will get the same attack information that goes to the military—we would be responsible for getting it to the rest of the population.

How has the equipment been improved since then? In the last 15 or 20 years, in terms of equipment, I really cannot address that subject. Maybe Grant can or maybe one of our experts.

"BOLT OUT OF THE BLUE"

Mr. **Peterson**. First, Mr. Chairman, I would like to respond to your statement about the "bolt out of the blue." I believe that is a proper analysis from our standpoint in this day and age. The Soviet Union spends approximately $4 billion to $5 billion per year on their civil defense program. We have very sophisticated satellite and intelligence methods that indicate to us that if there were this type of heightening of tension, the Soviets certainly would utilize those civil defense expenditures, and there would probably be an escalation in a warning period of time.

That is one of the reasons we emphasize the need in this budget for an enhancement of the Emergency Broadcast System, to communicate with the citizens, to provide a study for the NAWAS system, a 30-year old system, to determine how we can use the new technologies of today, sir, in enhancing the reliability and survivability of that system, and the beginning—and I would emphasize, if I may, just the beginning—of funding in areas of family protection information and volunteer information, which has been zero funded for many years. There is nothing in the pipeline that we can give families of any consequence, should they request it.

Another area that we have extreme concern about is emergency public information, which has been zero-funded for a number of years. This would be the information that we would provide to the media, at the time of escalation of tensions, that can be provided over the airwaves to inform our public as to what they should do, how they should prepare themselves, and what the threat is.

We have virtually none of that information either at the national level, at the State levels, or the regional levels, let alone the local levels. What we do have is outdated technologically and, for the most part, does not match the technologies of the modern broadcast systems, sir.

So, we are trying to build in this budget, and responding to your request of why the request for an increase, an effective civil defense program at reasonable dollar figures that will allow us to build, over time, a credible base for civil defense that is beyond emergency managers and paper planning. We must have a sound infrastructure, we believe, to communicate to the public and have such facilities as emergency operation centers at the State and local levels, sir.

Senator EXON. Senator Thurmond.

Senator THURMOND. Thank you, Mr. Chairman.

RELUCTANCE TO PARTICIPATE IN ATTACK PREPAREDNESS EXERCISES

Director Becton, is your agency experiencing reluctance on the part of some States to participate in attack preparedness exercises, and if so, what actions are available to you if a State or locality refuses to participate?

Director BECTON. As you know, Senator Thurmond, we did have a problem last year with two States, the States of Washington and Oregon.

I am happy to say that all States for 1988 have signed a cooperative and comprehensive agreement in which they will participate in attack readiness planning and will comply with what we interpret to be the intent of the Congress.

Senator THURMOND. Director Becton, what was the most persuasive argument in favor of increasing the civil defense budget for fiscal year 1989 well above the level of growth experienced by other national security claimants?

Director BECTON. Sir, for the last several years we have been rock bottom in terms of funding for civil defense, with I think $134 million and $135 million, respectively, for the last 2 years. That was not even maintaining the infrastructure that we needed.

We recognized and we got support from both the Department of Defense and the National Security Council that we have to do more, and we were able to make a presentation to increase, as you point out, by $26 million, what we needed. We believe it is essential that we start to send a message to a lot of people that we are serious about the protection of the American people.

Senator THURMOND. Director Becton, you note in your testimony that we must improve the survivability of dual use systems so that they can function in the event of an attack or catastrophic disaster.

SURVIVABILITY MEASURES

My question is how complementary are the survivability measures that one takes for nuclear attack preparedness and the measures that one takes for catastrophic disaster?

Director BECTON. There are several examples, Senator Thurmond.

One, the emergency operation centers, the EOCs, which are the hub, the coordination centers, where people gather to make things happen, whether we're talking about the fire people, the police people, the public works, the emergency medical people, whatever—the coordination center is there. That same center is used for a hurricane. That same center is used for a tornado or any other type of disaster.

The communications that will be used in a nuclear attack would be the same communications that would be used for any other type of disaster.

The warning system that would be used in a nuclear attack would be used for other disasters.

I could go on. Everything that we do in terms of preparing for an attack, with the possible exception of radiological monitoring instruments in the absence of radiation, would be used and available for use, dual-use, in an emergency.

CIVIL DEFENSE EDUCATION

Senator THURMOND. Director Becton, should one infer from your testimony indicating that you intend to stress standby educational materials to be disseminated in an emergency, that you would deemphasize civil defense education on a continuing basis? If so, is such a policy budget driven or based on experience, or some other factors?

Director BECTON. I'm not aware of any intention on our part to deemphasize the need for civil defense education. As a matter of fact, just the opposite I think is correct.

We recognized that by informing the public of what could be the worst case, we are also emphasizing what must be done in any other type of disaster.

Grant, do you want to add something to that?

Mr. PETERSON. I would concur.

While there is substantial merit in presenting and preparing information for all hazards, dual use, nuclear attack as well as natural and technological emergencies, I believe that we understand the intent of Congress in the Civil Defense Act of 1950, as it was reviewed in 1963 and 1964, again reviewed in 1975, and again reviewed in 1981, and the President's National Security Decision Directive number 259 is totally complementary to the decisions that the Congress made, and that is that we should include nuclear attack emergency information for the public, sir.

So I would concur with the Director's statement.

Senator THURMOND. Thank you very much.

I have a few more questions. If you would answer those for the record, it would save time.

Director BECTON. Yes, sir. Thank you.

Senator THURMOND. Mr. Chairman, I think my time is about up. I will just ask the rest of my questions for the record.

Senator EXON. Thank you very much, Senator Thurmond.

HIGHEST BUDGET PRIORITIES

Senator EXON. Director, since I indicated earlier that we have some budget crunch problems to go through, what is your highest priority new activity in the 1989 budget?

Let me put the question to you in this way.

If you had only one-half of your requested increase, or a 10 percent increase, to what program would you devote these funds?

I suppose the answer is the emergency radio information, is that correct?

Director BECTON. No, sir.

My highest priority within my entire FEMA budget is civil defense, and my entire FEMA budget is a request of $698 million, with 714 total outlays. But within that, my highest priority happens to be this program, civil defense.

Senator EXON. Of course, that is a pretty broad range.

In other words, I guess what I'm saying is I am asking you a most difficult question.

If you had to cut back, if you had to give up something, what areas would you retain or which areas would you give up first?

Director BECTON. Well, sir, I would put number one to retain as the crisis management infrastructure going from Federal down to State and local government because if we don't have that, nothing else is going to work.

Senator EXON. And what percentage in the increase of that budget of 20 percent is directed to that particular function? Half of it, or 75 percent, or 10 percent?

Director BECTON. Grant.

Mr. PETERSON. Mr. Chairman, in relationship to the increase that we are talking about today, that we are requesting, so that we have some opportunity to begin to give to the local and State governments the opportunity to have a viable infrastructure, which they do not today, four-fifths of all of the increase that we have asked for is programmatic in nature and goes directly to State and local governments. That is the percentage that we are asking for an increase.

It would be very difficult to try to take funds out of categories that have been historically almost zeroed out and have no credibility in the system for State and local governments any longer, sir.

I would beg your indulgence to state that we have undergone serious cuts in previous years which reduced almost all of the infrastructure items to nearly a zero funding. A $70,000 figure for all of the emergency operation centers in the United States is de facto zero funding, sir.

The same with the EBS system of $30,000—that is zero funding for all intents and purposes.

What we did was to try to retain our people—that is the $54 million figure—so that we would retain the historical knowledge and the professionalism. We also tried to retain the planning funds, which we did over those years of severe cuts.

What has atrophied tremendously during that period of time is the infrastructure, and we have been as conservative as we can in this budgetary time in making recommendations to you as to what is necessary.

I would just say that this total budget works out to about the cost of one cup of coffee per citizen in the United States per year—about 56 cents. And all of the public information and volunteer information that we are presenting and asking of you today to be able to produce for the dissemination to the public in a time of crisis works out to 1.3 cents per citizen.

I don't know how to recommend a budget to you that is any less than that, sir, that will do any kind of responsible job for our citizenry.

Senator EXON. I have several other questions that I am going to submit to you to answer for the record. But in the interest of conservation of time, let me just touch on two or three more.

I guess I would direct these to you, Director Becton. But if you want to refer them to those who are sitting at the table with you this morning, I will certainly understand.

Should not Federal resources also be available and be used, if necessary, in the event of noncooperation of State or local officials in not only a civil defense emergency but also in a radiological emergency associated with a nuclear power plant disaster, for example?

You would agree, I presume?

Director BECTON. I agree. Yes, sir.

COMPREHENSIVE COOPERATION AGREEMENT

Senator EXON. What compromises were reached, Director Becton, with the State of Oregon, in order to reach a comprehensive cooperation agreement on civil defense? You mentioned that State earlier, I believe, in your testimony.

How was the State's opposition to participating in simulated nuclear attack exercises resolved? Is this a new agreement, and is it consistent with the guidance provided by this committee that the legitimate needs of national security will not be subordinated to disaster relief?

While they go hand-in-hand, our responsibility, of course, is in the part of your function that has to do with the jurisdiction, the direct jurisdiction, of this committee.

Director BECTON. Sir, there are two parts to that answer.

Let me cover first the fact that this year's CCA, or comprehensive cooperative agreement, did not require an exercise. We define exactly what was intended under nuclear attack preparedness.

I placed a call to the Governor, which was not returned. I then asked the Associate Director, Grant Peterson, to travel to Oregon to discuss this matter with him.

I would like for him to specifically respond to your question as to what was the quid pro quo, if in fact we had one, that took place.

Senator EXON. Thank you.

Mr. PETERSON. My concern, sir, was that the Governor had not received nor understood totally the position of the Federal Emergency Management Agency under the direction of Congress. We take it very seriously that that is our charge, to perform in accordance with the direction of Congress.

Therefore, at the direction of Director Becton, I did go and speak with the Governor of Oregon. I had with me at the time a contract prepared for him which was the standard cooperative agreement that all other 49 States at that time had signed, and in the boilerplate area contains the same verbiage, sir.

So, to answer your question—was it different, for all intents and purposes it was the same, sir.

Senator EXON. Then I guess what you are saying is that the program had to be explained to the Governor and he and his agencies understand that we were not expecting any more or any less from the State of Oregon than we were from all of the other Governors of the States. Is that correct?

Mr. PETERSON. Absolutely correct.

Senator EXON. Would it be fair to term this difficulty you had with Oregon, then, just as a breakdown in communication or lack of understanding?

Mr. PETERSON. I think that we had to explain, and I did, that, not only by taking the contract to the Governor, but through a four-page letter of clarification of the position of this agency and how we interpreted the congressional law, and this had been run through our General Counsel, so that there could be no question about our position and our lack of ability to provide funding in a situation where the desires of Congress were not going to be met.

We explained that very clearly, left a signed document with the Governor, signed by us, and explained that all that was necessary was for him to sign that document and that we would get on with business and that we expected the work elements to be performed that were in the documents, sir, just like all other States.

Senator EXON. Would you give me just a thumbnail sketch of your understanding of the working relationship between the adjutant generals of States and the people who dealt with disasters. Is that generally true in all of the States, or in some instances are those two agencies, meaning the military, the National Guard, and the emergency response civil defense facilities not coordinated?

Director BECTON. Sir, I believe the number is 25 of our States have the emergency manager or civil defense director whatever you want to call him or her, under the State AG. Other States have them working in various positions.

The relationship without any doubt in my mind is very good at all States as they deal with the subject between the military and the emergency managers or the civil defenders.

Again, going back to Grant, who joined us just a couple of months ago—before that, his position was in Washington State, where he was working for the county government—he can give you a much better response of that relationship, as he looked up from his level to the State and the Federal Governments.

Mr. PETERSON. I did serve as an elected official in Spokane County in the State of Washington for 5 years, prior to coming here, and believe I have some sensitivities in dealing with the local issues.

I am very pleased to see the response that we have received from organizations such as National Coordinating Council on Emergency Management [NCCEM] and National Emergency Management Association [NEMA], who are the State managers, professional managers, who work for the Governors directly, and the local county and city organizations.

In fact, we have talked to over 35 of the State managers one-on-one, asking them for their input on our budget proposal. We also brought the board of directors of NCCEM and NEMA to our agency and spent a whole day reviewing where we were going, and the result of that, I believe, in their letters to Congress is that they support the funding level, and they support more importantly, sir, the logic of building a total program.

So, we are communicating. We are working very hard to communicate and to be responsive to the needs of the State and local governments in our planning process, sir.

Senator EXON. I would just say, from my experience, at least, that, if we should have that ultimate disaster of a nuclear exchange, there is not any question but that in most States the Governor would be working through his division of the military, which would be the National Guard, and, likewise, if most other States are like Nebraska—and I think they are—the Governor always turns to the National Guard for control and to carry out action when there is a flood, a tornado, or any other type of natural disaster.

So it seems to me that we should be encouraging, wherever we can, a very close working relationship because whether it is a natural disaster or a technological one, such as a nuclear exchange, the Governor's right arm would have to be, it seems to me, just because of the organization, his military functionaries.

That goes right on down, then, through the county and city governments. At least in Nebraska, it is never questioned.

Whenever there is any kind of disaster, the Governor takes action and it is always through the National Guard, and that is fully understood and implemented down in the counties.

Is that true in most States?

Director BECTON. That is true, sir, and I would like to ask Mr. Alderman to respond a little bit better because he represents the Department of Defense. But I can tell you that the relationship between FEMA and the National Guard through the military is very good because we have many other programs with which we deal with the National Guard as a close tie-in between this agency, the Department of Defense, the National Guard, and the States.

"BOLT OUT OF THE BLUE" ATTACK

Mr. ALDERMAN. Mr. Chairman, these few comments I am going to make here in part would respond to an earlier question of yours, which was how have we modernized our response in view of what is really an evolving threat, which now encompasses considerably more than the possibility of a "bolt out of the blue" attack.

The Department of Defense has had a planning program under way for several years now, under the aegis of the Commander-in-Chief U.S. Forces Command—a program called "Military Support to Civil Defense."

This program involves plans and procedures and liaison and capabilities in place through the entire continental United States, from the national level on down to the State and local level, which involve coordination and planning between the Active components, the Reserve components, the adjutant generals, and the emergency response mechanisms in those States and local areas.

It is very much an ongoing effort. It probably has been given a substantial boost by the creation of U.S. Forces Command as a specified command and the assignment of that joint service mission to the Commander-in-Chief of that command.

I am greatly encouraged by the progress that we and the total civil sector collectively are making in this area. We are not only planning to respond with potentially all the resources that we may have in our hands, but we are building the capability to respond to a multitude of threats, ranging on the one hand from a natural disaster through a low-level terrorist attack to perhaps a concerted attack on several vital installations or infrastructure nodes, all the way up to the ultimate catastrophe of a nuclear war.

It is very much real, very much alive, with a great deal of progress being made in this area. The civil defense program that we are asking you to bless today is an integral part of that total civil-military program, sir.

Director BECTON. One other point, sir.

I have a memorandum of understanding with both the Department of Defense and also, more specifically, with CINC Forces Command. I also have a GS-15 professional permanently assigned in Fort McPherson on the Forces Command Staff.

I could not ask for a better relationship between the military and defense, which implies the same thing exists with the National Guard, with which I also have a signed memorandum of understanding.

Senator EXON. I would just say that I think we all worry about the fact that if we have some kind of natural or unnatural disaster, power would be out and people could not use their radios and televisions. Let's always remember, as I tried to do when I was Governor, that there are relatively few people today who have to have power today to get information. Most people have an automobile and a radio in the automobile, which is completely independent from our light bulbs.

Let's just always remember that we do have a way to communicate with people—not as convenient as turning a switch on the wall, but we do have one. If we have a transmitter to broadcast, we can get through to people and the word can be spread very quickly.

Let's keep that in mind when we talk about how we are going to reach the people in case of an emergency, either a natural or unnatural one.

I have no further questions.

Senator Nunn.

Senator NUNN. Mr. Chairman, I tried to get here earlier, but I could not. I don't have any questions at this stage, but I appreciate your continued good work in this subcommittee.

Senator EXON. Thank you very much, Mr. Chairman.

Gentlemen, with that I just want to tell you that there will be some additional questions for the record.

[Questions for the hearing record with answers supplied follow:]

QUESTIONS SUBMITTED FOR THE RECORD BY SENATOR J. JAMES EXON

RADIOLOGICAL DEFENSE FUNDING

Senator EXON. What is the basis for requesting 50% increase in funding for "Radiological Defense?" What activities will be conducted with these added funds and do they contribute primarily to preparing for natural disasters or attack preparedness?

Director BECTON. The additional $4,542,000 will be used as follows:

$622,000—(a) to better care for the existing instrument inventory by allowing States to fill existing Radiological Defense Officer (RDO) vacancies;

(b) to provide RDOs with additional funds to enable them to conduct necessary workshops and seminars;

(c) to enable RDOs to work more closely with local jurisdictions to develop surgeable in-place RADEF capabilities; and

(d) to enable RDOs to develop a RADEF Annex that defines peacetime capabilities and applications.

$3,920,000—(a) to upgrade instrumentation engineering and logistical support projects in order to plan for and establish a firm foundation for a needed mobilization surge capability; and

(b) to begin to develop and implement a surge production industrial base for the mass production of the very large number of instruments needed for population protection.

It has been established that there exists a very large shortfall of instruments (FEMA publication CPG 3-1, September 1986, "Radiological Instruments: An Essential Resource for National Preparedness"). Our present manufacturing base does not have the capability to mass produce instruments in the quantities needed in the relatively short time frame when international tension might be rising. It is FEMA's design and plan to begin in fiscal year 1989 to develop the mobilization surge capability using the private industrial base whenever possible.

The additional funding contributes primarily to attack preparedness. This is our primary responsibility. However, the instruments and the training (i.e., those persons trained to use these instruments) have limited application to peacetime radiological emergencies.

FEMA FUNDING INCREASE

Senator EXON. Am I correct that FEMA is asking for a 180% increase in funding for what you call "State and Local Direction, Control and Warning" on Tab A of your statement? To what will these funds be devoted? How certain are you that Warning and Communication systems can be protected against electromagnetic pulse (EMP)?

Director BECTON. The increase in our State and Local Direction, Control and Warning request should be put in context, since this program has been grossly underfunded in the past several years. You will note in particular, that the EOC program, for which $5,000,000 is being requested, has had no dollars to pass to State and local governments since fiscal year 1985, except $1,250,000 in fiscal year 1988 which is being used to develop a State EOC Prototype. Other elements of this program have experienced the same funding history.

The fiscal year 1989 funds will be expended to enhance the survivable crisis management capabilities at the State level of a network comprised of the State EOC (outside 2 psi, with transportable communications and support equipment), survivable EBS station, including a "last resort" network of primary entry point (PEP) stations that will give maximum national EBS coverage, and EMP protection.

Present technology is available to provide EMP protection for warning and communications systems, thus we are virtually certain protection can be attained. This protection can be cost-effective and timely. Our present approach is to provide a tailored retrofit for EMP protection to existing facilities. When EMP protection engineering design is an integral part of a new facility, the protection is more effective from a cost and protection standpoint. Therefore, any new warning or communications systems design should include EMP protection.

STATES IN AGREEMENT

Senator EXON. Are the states in agreement with your statement that the emphasis of 1989 civil defense funds is to improve "the attack survivability of facilities and systems which are needed and used frequently in peacetime disasters but which cannot be relied upon to operate under attack conditions?" Does this emphasis support the "dual-use" mandate of the Civil Defense Act?

Director BECTON. As Grant Peterson, my Associate Director for State and Local Programs and Support, noted in his oral testimony, we talked to over 35 of the State emergency management directors one-on-one, asking them for their input on our budget proposal. We believe the states firmly support the thrust of our 1989 request and the logic of that request. Certainly the State directors all know at first-hand the atrophy and erosion which has resulted from negligible or zero funding of infrastructure systems including among others emergency operating centers, warning and communications systems, and the Emergency Broadcast System.

This emphasis on beginning to rebuild the physical infrastructure of emergency systems is completely consistent with the "dual-use" mandate of the Civil Defense Act. As I pointed out in my own oral testimony, the emergency operating center that would be needed to coordinate operations in an attack emergency is used in a hurricane, a tornado, or any other type of peacetime disaster. The same is true of warning systems, communications, and the stations of the Emergency Broadcast System. They are all essential in case of attack but they all can be used, should be used, and indeed are used in the peacetime disasters which so frequently occur.

COMPREHENSIVE COOPERATIVE AGREEMENT

Senator **Exon**. Do you interpret the Comprehensive Cooperative Agreement signed with the State of Oregon to include a requirement for the State to plan for the protection of its citizens against all hazards, including strategic nuclear attack? If so, why did Oregon Governor Goldschmidt state that the contract "excludes all activities relating to nuclear war planning?" What is your reaction to the statement of the Governor's legal counsel, after signing the new Agreement, that "we don't believe the contract requires us to plan for full scale nuclear war?" Is this a correct reading of the new contract?

Director **Becton**. The existing Comprehensive Cooperative Agreement (CCA) between the Federal Emergency Management Agency (FEMA) and the State of Oregon clearly includes the requirement that the State will plan for the protection of its citizens against all hazards, including strategic nuclear attack. The Comprehensive Cooperative Agreement Articles, which are the terms and conditions that both parties agree to abide by, states that, "In every program funded under the Civil Defense Act, nuclear attack preparedness must be specifically addressed within the context of all hazards emergency preparedness." (Agreement Article II, Scope of Work.)

In addition, FEMA clearly defined the purpose of nuclear attack preparedness and explained its legal basis in its January 26, 1988, letter from Grant C. Peterson, Associate Director, State and Local Programs and Support, to Governor Goldschmidt (attached). This letter also transmitted the fiscal year 1988 CCA for the Governor's Authorized Representative to sign, making clear that signature of the CCA by the State constituted agreement to do nuclear attack preparedness as defined in the CCA.

Although there have been public statements that the CCA does not require nuclear war planning, Oregon has nevertheless signed a legally binding agreement that does require nuclear war planning. The Federal Emergency Management Agency, therefore, accepts the premise that the State of Oregon will, in good faith, honor its obligations under the legal document.

The interpretation of the legal requirements of the CCA by Governor Goldschmidt's legal counsel is inaccurate. Use of funding by States provided through the vehicle of the CCA requires adherence to the legal constraints imposed by its authorizing program legislation, FEMA regulations and the terms of the Agreement. Use of civil defense-supported funding is authorized by the Federal Civil Defense Act of 1950, as amended, which makes clear the intent of the Congress of the United States that funds appropriated for activities under this Act should be for nuclear war planning. Section 501(b)(1) of the Act states:

It is further the sense of Congress that an improved civil defense program should be implemented which—(1) enhances the survivability of the American people and its leadership in the event of *nuclear war* and thereby improves the basis for eventual recovery and reduces the Nation's vulnerability to a *major attack*. (Emphasis added.)

Enclosure:

Federal Emergency Management Agency,
Washington, DC, January 28, 1988.

Hon. **Neil Goldschmidt**,
Governor of Oregon, Salem, OR.

Dear Governor Goldschmidt: On Tuesday and Wednesday of last week (January 19 and 20, 1988 respectively), the Honorable Julius W. Becton, Jr., the Director of the Federal Emergency Management Agency (FEMA), tried unsuccessfully to contact you to arrange for me to meet with you regarding FEMA's Fiscal Year 1988 civil defense funding for the State of Oregon. As you have not returned his calls, instead of a personal meeting I am taking the opportunity to communicate with you via this letter.

FEMA has received the State of Oregon's amended Comprehensive Cooperative Agreement (CCA) submission dated January 6, 1988. Although a review of your submission shows considerable agreement, there remain a few areas which are unacceptable. Since your funding is short and time is of the essence, I have taken the liberty of appending to the text of your submission amended language that, if agreeable to you, would constitute acceptable statements of work. The enclosed CCA package, therefore, if signed by you, would be acceptable to FEMA and would allow us to fund Oregon for the remainder of Fiscal Year 1988, provided all requirements are faithfully fulfilled.

During the course of our negotiations, I believed that we had reached agreement. However, your January 9 press release indicates otherwise. The statement that, "at [your] insistence, the contract excludes all activities relating to nuclear war planning" and that FEMA agreed with that position is simply not correct.

As a former Secretary of Transportation, you know that all Federal programs must be administered within the legal constraints imposed by authorizing legislation, rules and regulations, and individual agency operating policies. With specific regard to the civil defense program, FEMA operates within the following constraints:

(1) Section 501(b)(1) of the Federal Civil Defense Act, as amended, explicitly states: "It is further the sense of Congress that an improved civil defense program should be implemented which—(1) enhances the survivability of the American people and its leadership in the event of *nuclear war* and thereby improves the basis for eventual recovery and reduces the Nation's vulnerability to a major attack." (Emphasis added.)

(2) Section 2-204 of Executive Order 12148, dated July 20, 1979, states: "In order that civil defense planning continues to be fully compatible with the Nation's overall strategic policy, and *in order to maintain an effective link between strategic nuclear planning and nuclear attack preparedness planning*, the development of civil defense policies and programs by the Director of the Federal Emergency Management Agency shall be subject to oversight by the Secretary of Defense and the National Security Council." (Emphasis added.)

(3) National Security Decision Directive Number 259 dated February 4, 1987, states: "The civil defense program will continue to support all-hazard integrated emergency management at State and local levels, to the extent that this is consistent with and contributes to preparedness of the Nation *in the event of an attack, whether by nuclear or non-nuclear means*. . . . The civil defense program will provide improved prospects for protection of the population and resources of the Nation *in the event of nuclear attack* and improved ability to deal with any occurrence, including natural, technological, or other emergency, *which seriously degrades or seriously threatens the national security of the United States*. . . . *The States* have the primary responsibility for developing their capabilities for peacetime emergencies and *share responsibility for attack preparedness . . . . Federal funds and assistance for all elements of the civil defense program will be applied to develop capabilities required for attack preparedness and other disasters having national security implications.*" (Emphasis added.)

(4) Agreement Article II of the Fiscal Year 1988 Comprehensive Cooperative Agreement requires that: "In *every* program funded under the Civil Defense Act, *nuclear attack preparedness must be specifically addressed* within the context of all hazards emergency preparedness." (Emphasis added.)

(5) A definition of attack is found in chapter 13, paragraph 13-3.d of Civil Preparedness Guide 1-3. The language is as follows: "For National Security Exercise purposes, *the term ATTACK covers the following: a strategic and/or tactical nuclear strike on the United States*, sabotage, the use of non-nuclear explosive, radiological, chemical, bacteriological, biological, or any other weapon whether employed conventionally or unconventionally." (Emphasis added.)

The above language can leave no doubt in any mind that the Congress and FEMA use the terms nuclear war and nuclear attack to include a strategic nuclear strike within the geographical boundaries of the United States. For civil defense purposes the term "attack" encompasses, as it always has, "nuclear war."

Under the Federal Civil Defense Act, and in accordance with the intent of Congress, funds appropriated under this legislation are to be used primarily for preparedness against nuclear war waged against the United States within the geographical boundaries of the States and territories. Congress has also provided that actions taken in response to fulfilling this primary civil defense mission may be used to prepare for and respond to other major life threatening natural or technological disasters, so long as these activities contribute to attack preparedness.

In response to the wishes of Congress, it has been our policy that all persons, equipment, facilities, training, and other activities funded in whole or in part by civil defense funds are not only allowed to be applied in preparing for or responding to peacetime disasters, but are encouraged to be so used to the maximum extent possible. We may not, however, administer Civil Defense Act funds in a manner to allow nuclear war preparedness to be ignored. Our CCA application package must therefore reflect the primary purpose and requirements of the Civil Defense Act.

Our position was recently confirmed by the General Accounting Office (GAO) of the Congress. In a report (GAO/NSIAD 88-52) issued December 1987 the GAO specifically noted that:

> Under existing law, civil defense funds are to be used to prepare for the protection of the civilian population *in the event of an enemy attack, and may be used for natural disasters to the extent that the use of such funds for such purposes is consistent with, contributes to, and does not detract from attack-related civil defense preparedness.* However, FEMA's internal assessments and our tests of Fiscal Year 1985 expenditures showed that FEMA's primary focus for civil defense funds was to plan for natural and technological disasters. (Emphasis added.)

The report details findings, including FEMA's corrective actions, specifically its "re-emphasis on attack preparedness." GAO notes that, "FEMA's actions represent a reasonable effort to correct the weaknesses we identified in our review."

The civil defense program is a voluntary partnership of the Federal, State, and local governments of our Nation to prepare primarily against the effects of nuclear attack. The preparedness capabilities that result can be applied to the full range of natural and technological disasters. We invite the State of Oregon to participate in a program which we believe fulfills Government's first and most important responsibility to its citizens—to provide for their protection in peace and war.

Oregon is the only State for which acceptable CCA negotiations have not yet been concluded. The choice for Oregon, however, as it was for all the other States and territories, is dependent on your willingness and commitment to participate in a genuinely *all*-hazards civil defense program. We remind you that there are no provisions in Federal law which require Oregon to apply for civil defense funding. If you choose not to participate in the civil defense program, other funds for peacetime emergency preparedness remain available to Oregon. These include the Disaster Preparedness Improvement Grant, Hazardous Materials training funds, and the Earthquake Preparedness, Hazard Mitigation Assistance, and Community Assistance programs. In addition, should a natural disaster strike and the President make a disaster declaration for areas of Oregon, Federal officials would respond and administer Federal aid under the provisions of the Disaster Relief Act.

While we have in good faith continued to fund civil defense programs during the continuation of these negotiations, this letter constitutes our final effort to clarify the role of nuclear attack preparedness in the civil defense program. Accordingly, as previously mentioned, the enclosed CCA signed on behalf of FEMA requires only signatures on behalf of the State and delivery to FEMA (Regional Director, Region X) in order for Oregon to participate in the CCA programs during Fiscal Year 1988. Unless the document signed on behalf of the State is received by FEMA within 30 days of your receipt of this letter, FEMA will have no alternative but to consider the CCA rejected by Oregon and initiate procedures for termination of funds.

On behalf of the Director and myself, let me assure you our deep desire to work with Oregon and continue the partnership we have had for so long.

Sincerely,

GRANT C. PETERSON,
Associate Director, State and Local Programs and Support.

CIVIL DEFENSE ACT

Senator EXON. Last year this committee expressed its intention to review the Civil Defense Act for its consistency with the dual-use aspects of civil defense. Section 501(b)(1) of the Civil Defense Act states that "It is the sense of Congress that an improved civil defense program should be implemented which . . . reduces the Nation's vulnerability to a *major attack*," and "is *adaptable* to help deal with natural disasters and other peacetime emergencies." Do you believe that the focus of the Civil Defense Act should be changed from its current emphasis on attack-related preparedness to greater attention to the dual-use aspect of civil defense?

Director BECTON. I believe that the focus of the current Civil Defense Act is optimum and should not be changed to greater attention to dual-use aspects. As I noted in my statement for the record, I believe that the current program, conducted under the Act as it now stands, embodies a balance which is acceptable and beneficial to all parties.

We develop and deploy civil defense systems based on their importance to the national defense. Once the systems have been so deployed, they can be sued and they are used in peacetime emergencies. I believe this strikes the right balance between preparedness for an attack disaster we all hope will never occur, but which is not impossible, and the natural and technological disasters which do occur all too often.

To change the focus of the Act to greater attention to dual-use aspects of civil defense would, we believe, result in a program which in practice would not be dual-use in nature but would focus largely upon peacetime emergencies to the near-exclusion of attack preparedness. The report FEMA submitted to this committee in July 1986 pointed out that the unintended consequence of the Agency's all-hazard emphasis in 1984-1986 was the ". . . continued deterioration of already dangerously low levels of attack preparedness. For many State and local officials . . . 'all-hazard' has come to mean all hazards except nuclear attack. . . ." We remain committed to the all hazard approach, but this means *all* hazards, not all except attack.

CIVIL DEFENSE SURGE ACTIONS

Senator EXON. Your statement indicates that a new emphasis in civil defense is "surge" actions to prepare for increasing international tension. What are "surge" actions and how much of the fiscal year 1989 request is devoted to such activities?

Director BECTON. "Surge" actions would embrace the full spectrum of civil defense systems and capabilities, seeking to improve these as rapidly as possible in a time of increasing international tension, building upon the base or infrastructure existing at that time. Actions would include, among others, providing survival information to the public (emergency public information) via the mass media; hiring and training additional personnel at State and local level to conduct highly accelerated shelter surveys and emergency planning; training 3 to 4 million radiological managers and shelter managers; and producing some 60 million radiological instruments needed to protect the population.

No industrial base for this surge production of instruments now exists, which illustrates that to be able to surge civil defense capabilities, a base for surge actions must be developed in peacetime. Similarly, surge training of large numbers of personnel requires that standby courses and video materials be developed in peacetime to provide the base for training conducted throughout the country during a surge period. Providing survival information for the public requires that the standby mass media materials (the base) be prepared in peacetime.

Our fiscal year 1989 request addresses surge planning and preparedness under several headings:

	Millions
Radiological Defense Instrumentation (page EM-2 of the Budget Request), engineering support for the surge base, and beginning development of the surge production base	$3.430
Policy and Planning, under Research (page EM-48), surge plans and documentation (e.g., guides for accelerated planning), also system to detect spontaneous evacuation	.595
Training, Instructional Programs (page EM 53-54), surge-related courses and materials for State and local personnel	.340
Emergency Public Information (page EM-59), comprehensive EPI materials including media materials	1.400
Total	5.765

FEMA'S HIGHEST PRIORITY FUNDING

Senator EXON. Within the civil defense budget, what is the highest priority funding increase requested? If only half of FEMA's requested increase for civil defense could be funded, what activities would be delayed or deleted?

Director BECTON. I would like to stress that our 1989 request of $160.3 million for civil defense was approved within the Executive Branch after exhaustive scrutiny, with full consideration of the deficit as well as of the 1989 requests for other defense and defense-related programs. It is part of the President's Budget. Our 1989 request has the "endorsement and full support of the Department of Defense," as Mr. Craig Alderman, the Deputy Under Secretary of Defense for Policy, testified at the April 12 hearings, and it is supported by the National Security Council as well, as an essential element of national security.

I think it might be helpful to review the context of the Administration's decision to request $160.3 million to begin rebuilding U.S. civil defense capabilities. It is true that the President's Budget requests a 1989 increase of some $26.7 million, or 20 percent, over the 1988 appropriation of $133.6 million. But the 1988 level marked an all-time low, in real dollars, while the 1986 and 1987 appropriations were runners-up in this regard.

As I said in oral testimony, civil defense funding has been at rock bottom for several years. It was not even maintaining capabilities developed by prior investments. As we reported to the committee in July 1986, "U.S. civil defense capabilities are low and declining," and that remains the fact today, half-way through fiscal year 1988.

A 20 percent increase over in all-time low may appear significant in percentage terms but it is extremely modest in absolute terms. To put the request in further context, the actual 1985 appropriation would equal $205 million in 1989 dollars. That is, the 1989 request of $160.3 million is only 78 percent of the funds actually appropriated for 1985.

It was these considerations which resulted in the DOD and NSC support noted above the 1989 civil defense request, in the context of decisions on other defense-related programs. The 1989 increase requested for civil defense may well be among the largest for any defense-related element, as noted at the hearings. However, we believe that few other elements had been subjected to a one-third cut, which was the case for civil defense in 1986, prior to my tenure as Director, and which put the program well below a maintenance level.

Accordingly, I would urge that the subcommittee approve the full $160.3 million requested in the President's Budget for 1989. It is the absolute minimum required to begin rebuilding civil defense capabilities which are now low and declining. National Security Decision Directive 259, approved by the President in February 1987, stresses that civil defense is an essential element of our overall national security posture, but at its current level it cannot fulfill that role.

EXPANSION OF CIVIL DEFENSE BUDGETS

Senator Exon. Is the fiscal year 1989 budget request for civil defense of $160M a precursor to larger budget requests in the future. Does FEMA foresee the continued expansion of civil defense budgets?

Director Becton. I am unable to predict whether civil defense requests in 1990 and beyond will be greater than the 1989 request. Personally, I am convinced that they should continue to increase. This is because of the very low level of current capabilities, in particular of the physical infrastructure of emergency systems and facilities. At the 1989 request level it will take too long, in my judgment, to make the improvements required for civil defense to become an effective element of our overall national security posture.

Budget decisions will be made, however, year by year in light of the deficit and all other relevant factors. That is, we will take it a year at a time though, again, I believe personally that civil defense capabilities should be improved with all deliberate speed.

COMPREHENSIVE COOPERATIVE AGREEMENT

Senator Exon. Was Oregon's agreement to the Comprehensive Cooperative Agreement (CCA) based on the fact that a simulated nuclear attack exercise is not scheduled for the term of this contract? Is Oregon unlikely to sign a future CCA that requires the state to participate in a nuclear attack exercise? If so, how does FEMA plan to address this matter?

Director Becton. In fact, the fiscal year (FY) 1988 CCA does not specifically require a full-scale nuclear war exercise. All States are required to participate in national security exercises once every 3 years. Last time Oregon participated was in 1987, so next exercise requirement is in 1990. We would expect that Oregon would participate, as do all other 49 States, in a national security exercise.

COOPERATION DURING CIVIL DEFENSE EMERGENCY

Senator Exon. It is correct to assume, is it not, that if a local fire or police chief did not cooperate during a civil defense emergency, that Federal resources would be used to compensate for the lack of compliance?

Director Becton. In my oral testimony I agreed that Federal resources should be available and used, if necessary, in the event of noncooperation of State or local officials in civil defense emergency.

I would add, however, that in an attack emergency the quantity of Federal resources available would likely be in the range of very little to negligible, relative to the overwhelming needs of communities throughout the country. The Active and Reserve-component forces of our military services comprise by far the greatest Federal resource potentially available to assist civil governments. However, if an attack on the United States were preceded by a substantial period of increased international tension and military mobilization, a large percentage of these forces might have been deployed overseas, including National Guard forces. Relatively few military forces, therefore, might be available to support the operations of civil governments in the event of an attack emergency. The situation could be otherwise, however, in a lesser emergency such as a natural disaster.

We find it difficult to conceive, though, that any significant percentage of local officials would fail to cooperate during a civil defense emergency. Certainly experience in peacetime emergencies is that virtually all local officials with emergency roles meet their responsibilities fully and indeed admirably.

STATE AND LOCAL COMPLIANCE

Senator EXON. And isn't it true that the lack of compliance by an important State or local organization such as a police, fire department, or township or county could jeopardize the health and safety of citizens in the surrounding areas during a civil defense emergency?

Director BECTON. If a State or local government or organization failed to respond to a civil defense emergency, this would clearly jeopardize the health and safety of citizens. However, as noted in the response to the preceding question, we find it difficult to conceive of this occurring on any significant scale, based on experience in peacetime disasters.

RADIOLOGICAL EMERGENCIES

Senator EXON. Hasn't Congress stated in the past that such Federal resources should be available for radiological emergencies associated with nuclear power plants as well as for civil defense emergencies?

Director BECTON. Such was stated in the Conference Committee language conveyed to FEMA Director Becton, in a letter dated November 13, 1985, from the Chairmen of the House and Senate HUD-Independent Agencies Appropriations Subcommittees, Senator Garn and Mr. Boland. The letter states, in part, that . . . "It is the committee's desire that FEMA explores all alternatives for establishing adequate offsite preparedness at commercial nuclear facilities in the event that State and local governments do not participate in the preparation, exercise or implementation of radiological preparedness plans. In that regard, it is still the committee's intention that, in its review of plans, FEMA should presume that Federal, State and local governments will fulfill their responsibilities to carry out critical aspects of the emergency planning process and will take the necessary steps to be able to implement the resulting plan if an emergency occurs. However, where State or local participation in the exercise or implementation of offsite plans is inadequate, the committee intends for FEMA, as a last resort, to coordinate the supplemental assistance of Federal agencies that are expected to provide requisite resources within their authorities. The committee believes it is clear that FEMA has the authority to perform that function and intends that such authority should be exercised where necessary for an effective emergency response."

FEMA does not, in fact have the authority to *require* the supplemental assistance of Federal agencies to State and local governments. However, FEMA is responsible for the Federal Radiological Emergency Response Plan (FRERP) which is to be used by 12 Federal Agencies in peacetime radiological emergencies and which concerns the offsite Federal response in support of State and local governments with jurisdiction for the emergency. The FRERP neither adds to nor detracts from the Federal member agencies' statutory authorities.

QUESTIONS SUBMITTED FOR THE RECORD BY SENATOR STROM THURMOND

"DUAL USE" COMPROMISE ATTACK PREPAREDNESS

Senator THURMOND. In your judgment, is the principal focus on the civil defense program funded in the 050 account on attack preparedness? Are there examples where "dual-use" compromises attack preparedness?

Director BECTON. The principal focus of the civil defense program is indeed upon attack preparedness. As I noted in response to a question for the record by Senator Exon, we design and deploy civil defense systems based on their importance to the national security. Once they are so deployed, they should be used and they are used in peacetime emergencies. We welcome this because using these systems in real emergencies stresses and exercises the systems and staffs, improving their readiness.

In managing the civil defense program, we are mindful of the injunction of Section 207 of the Civil Defense Act, added at the initiative of this subcommittee during the process which resulted in the 1981 amendments relating to dual-use of civil defense. Section 207 provides that civil defense funds made available to the States may be used to prepare for peacetime disasters, but only to the extent that this ". . . is consistent with, contributes to, and does not detract from attack-related civil defense preparedness."

There are no examples where genuine "dual use" compromises attack preparedness. Our concern, in managing the program, is to assure that all civil defense funds in fact contribute to and do not detract from attack preparedness, as required by section 207. As I noted in my oral testimony, our fiscal year 1988 Comprehensive Cooperative Agreements with the States require this, and all 50 States have signed these agreements. The fiscal year 1989 agreement, to be negotiated with the States by the end of the current fiscal year, continues this emphasis on attack preparedness.

CIVIL DEFENSE SURGE ACTIONS

Senator THURMOND. You note that a new emphasis is to expand civil defense by "surge actions." What measures, other than the production of radiological instruments, would be included in such a surge period? Do our strategic offensive or defensive forces policies depend on similar surge capabilities?

Director BECTON. As noted in my response to a question for the record submitted by Senator Exon, "surge actions" would embrace the full spectrum of civil defense systems and capabilities. They would include, among others, providing survival information to the public, hiring and training additional local and State personnel for emergency planning and preparations, and training 3 to 4 million radiological monitors and shelter managers.

The Department of Defense would be in the best position to response to the question regarding surge actions and our strategic offensive or defensive forces. To the best of my knowledge, surge actions are not relied on to any significant degree to expand our strategic (nuclear) offensive or defensive forces. I understand that surge-type actions are significant, however, with respect to expanding our conventional, or general-purpose, forces.

EMERGENCY OPERATING CENTERS (EOC)

Senator THURMOND. Could you describe the types of activities that would take place from a survivable emergency operations center?

Director BECTON. Emergency Operating Centers (EOC) are facilities where State and local government Chief Executive Officers (Governor, Mayor, etc.) and other key officials assemble in times of major emergencies to conduct the necessary business of providing life-saving and life-sustaining services to their respective communities. These facilities are equipped with communications and life support equipment that enable emergency workers to identify emergency response requirements based on damage assessment, and coordinate with field forces (including police, fire, etc.) as well as citizens who may be housed in public shelters or in their homes. These facilities also provide direct linkage to the Emergency Broadcast System (EBS) for the purpose of disseminating emergency information to the general public.

FEMA is placing emphasis on the survivability of these facilities against the affects of radioactive fallout due to nuclear attack, as well as the effects of electromagnetic pulse on electrical equipment. Such features enable government officials to operate in a reasonably safe environment until fallout has decayed to levels permitting travel outside the EOC, and reconstitution of normal day-to-day government operations.

OUTYEAR PROGRESS

Senator THURMOND. When you say that this budget "will lay the foundation for steady progress in the outyears" do you also mean that it lays a foundation for steady growth in the level of funding allocated for civil defense? What are the implications of the fiscal year 1989 funding level for funding requirements in fiscal year 1990 and the years following?

Director BECTON. As noted in my response to a similar question posed by Senator Exon, I am unable to predict whether civil defense requests in fiscal year 1990 and beyond will be larger than the 1989 request. Budget decisions will be made year by year in light of all relevant factors, including the budget deficit. I believe personally that civil defense improvements should be accelerated, because of the very low level of current capabilities, but as regards future budget requests we will take it a year at a time.

Senator EXON. We appreciate very much your being here, and we are adjourned.

[Whereupon, at 11:38 a.m., the subcommittee adjourned, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

FRIDAY, APRIL 15, 1988

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES
AND NUCLEAR DETERRENCE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

B-1B TEST PLAN AND PROGRAM

The subcommittee met in executive session, pursuant to notice, at 9:10 a.m., in room SR-222, Russell Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Glenn, and Thurmond.

Staff present: Robert F. Bott, Brian D. Dailey, William E. Hoehn, Jr., Ronald P. Kelly, and T. Kirk McConnell, professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Milton D. Beach, assistant to Senator Glenn; Mark J. Albrecht, assistant to Senator Wilson.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. The subcommittee will please come to order.

The Subcommittee on Strategic Forces and Nuclear Deterrence meets today in closed session for its 13th hearing in review of the fiscal year 1989 amended budget request.

Our hearing today is focused on an important issue—the extent of progress in straightening out the well-publicized problems of the B-1B and what it has encountered with its defensive avionics system.

Last year, the committee was told it would take 2 years and more than one-half billion dollars to achieve the hoped-for baseline capability. This was not welcome news.

But the committee felt then that we had no option but to try to fix the problem.

At the same time, however, we recognized our obligation to watch over the expenditure of taxpayers' hard-earned dollars.

Accordingly, the Congress approved the fiscal year 1988 request, but insisted as part of that approval that the Air Force develop and give us a detailed test plan.

We also required bimonthly reports beginning February 1 of this year.

Our purpose was not to punish or micromanage the Air Force or the DOD. Rather, it was to build, here in the Congress and in the public, confidence in the credibility of the Air Force get-well efforts in this regard.

The Department's response to date, however, is not as robust as I would like to see it. The test plan has only a very sketchy test schedule, and it is not possible for us to demonstrate convincingly that testing is, in fact, being accomplished as planned. We would hope that that can be straightened out in this hearing this morning.

Moreover, the committee has not received either a February 1 or a April 1 bimonthly progress report. We don't like that. We would like to have you address that this morning. Why is it that when you are told to do something you don't snap-to?

Thus, there is no credible data to which this committee can point to refute the position the House Armed Services Committee has put in its markup.

I shall have more to say about this problem during the question period.

In the meantime, we hope through this hearing to develop some evidence to counter the House Armed Services Committee's position.

We generally seem to find ourselves in this position each and every year. We are looking forward to the answers, or this problem is going to be a much bigger trouble than you think it might be or than we would like to see it.

Our first witness will be Maj. Gen. Michael Hall, who is the Director of Strategic SOF and Airlift Programs for the Assistant Secretary of the Air Force (Acquisition).

He will be providing most of the information and data on the progress that we have to date in sorting out the defensive avionics problem.

We will then hear both from Hon. John Krings, who is the Director of the Operational Test and Evaluation, and from Dr. Larry Woodruff, who is the Deputy Under Secretary for Strategic and Theater Nuclear Forces at OSD.

Mr. Krings and Dr. Woodruff will each provide their separate and independent views on the extent of the Air Force's progress and other issues.

I want to welcome you gentlemen. We will get to your testimony now.

I just hope that in my opening statement I have put to you in a fair and straight-forward manner the concerns and the difficulty this chairman, this subcommittee, and the Armed Services Committee of the U.S. Senate find themselves on this program. We are looking forward to some straight talk and some straight answers.

With that, General, I am very glad to recognize you now.

STATEMENT OF MAJ. GEN. MICHAEL D. HALL, DIRECTOR OF STRATEGIC, SOF, AND AIRLIFT PROGRAMS, ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION), DEPARTMENT OF DEFENSE, ACCOMPANIED BY BRIG. GEN. ROBERT E. DEMPSEY, DEPUTY CHIEF OF STAFF, STRATEGIC PLANNING AND ANALYSIS, STRATEGIC AIR COMMAND

General HALL. Thank you, Mr. Chairman and members of the committee.

I thank you for this opportunity to discuss the B-1 program.

During the last year, there has been considerable effort and considerable progress made, and today I would like to highlight some of the achievements, while specifically addressing test program status and accomplishments.

Mr. Chairman, with your permission, I have a prepared statement that I would like to submit for the record.

Senator EXON. General, without objection, we are very pleased to receive that statement in full.

Senator Thurmond is now with us, and I would interrupt you for just a moment at this time to ask him if he has any opening statement that he would like to make.

Senator THURMOND. I have an opening statement which I can put into the record to save time.

Senator EXON. Thank you.

We will accept the opening statement from Senator Thurmond.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT OF SENATOR STROM THURMOND

Thank you, Mr. Chairman. I join you in welcoming our witnesses to the subcommittee this morning for this very important hearing. Since 1981, bomber modernization and related programs have received more funding than any other component of the strategic modernization program, and have received a corresponding amount of scrutiny by this subcommittee.

The accomplishments in the bomber modernization program over that period have been extraordinary. We have fielded 100 B-1B bombers on schedule and within cost; we have upgraded B-52s with Air Launched Cruise Missiles and are developing a second, much more effective Air Launched Cruise Missile; we have made impressive progress on developing a revoluntionary B-2 bomber; we have initiated a much needed development of a new SRAM missile; and we have added significantly to our strategic tanker capability with the reengining program.

As you know, Mr. Chairman, these accomplishments have not been without their setbacks, and this morning's hearing will afford an opportunity to review the program which the Congress has mandated to restore full capability to the B-1B. We will also have an opportunity to receive a briefing on the B-1B, which I understand conveys a very powerful message with respect to the mission capabilities of the B-1Bs that stand strategic alert today.

Mr. Chairman, I would like to make one final point with respect to the position that this committee has taken and is likely to take again this year with respect to B-1B modifications. Our first priority must be to establish with confidence the baseline B-1B electronics countermeasures capability. At the same time, the Air Force should not interpret this priority today as foreclosing options in the future to the B-1B that would improve its effectiveness for the strategic or for conventional missions. We must look on the B-1B as a national asset that will be available well into the next century as a delivery vehicle with tremendous potential for a wide variety of missions requiring its payload to range capabilities.

I look forward to this morning's testimony, Mr. Chairman, and will have questions for the witnesses at the appropriate time.

Thank you, Mr. Chairman.

Senator EXON. Please proceed, General, in any fashion that you see fit.

General **Hall**. Thank you, Mr. Chairman.

To begin our discussion of the B-1, I would like to ask General Dempsey from the Strategic Air Command to present a brief overview of SAC's employment of the B-1 as a penetrating bomber.

General Dempsey is currently the Director of Strategic Planning and Analysis at SAC Headquarters at Offutt Air Force Base.

He was also the wing commander of the 96th Bomb Wing at Dyess Air Force Base, when the first B-1s were delivered to Strategic Air Command.

General Dempsey.

General **Dempsey**. Good morning, Mr. Chairman. It is a pleasure to be here.

I bring you greetings from General Chain in Omaha and I will stand over here, if you don't mind, to talk about the method we are using today to deploy the B-1 in the Single Integrated Operational Plan, the SIOP.

[Charts deleted.]

The way I will do that is through three different perspectives. First, I will give you a few brief points about the airplane itself, primarily focusing on the mission that the B-1 would be playing now and then, and finally, the bottom line.

[Charts deleted.]

The B-1 is at these four bases in the United States. I think that is well known. The submarine threat is the primary reason for their location.

[Charts deleted.]

It carries a number of weapons, and these are the two principal ones that we are talking about today for the B-1. There is the Short-Range Attack Missile, shown in the background here, the SRAM-A, and in the foreground is the B-83 gravity bomb. It also can carry the B-61 bomb.

[Charts deleted.]

The key element of any manned system and aircraft in this case, a bomber, is the aircrew. For every authorized B-1B we have, we have an assigned aircrew and a mission plan.

[Chart deleted.]

The crew takes this mission, studies it very diligently, and maintains currency on that mission, and they formally certify, normally to the wing commander, to ascertain that they are, in fact, proficient on it. They maintain their proficiency through study and exercise, while they are on alert.

[Chart deleted.]

This (indicating) is the mission plan profile of the events that occur and the points as they happen in time along the mission, and on the right you see a global projection of this particular mission, [deleted].

I will talk about each of these points as they come along.

[Charts deleted.]

Here, beginning from alert status, the aircrew would be told by a message, by a central warning to respond. They will do so as rapidly as possible to the aircraft, and they would first use what we call a slap switch on the nose gear, which activates the auxiliary power units on each side, which starts the aircraft prepping up for engine start, while they jump in the seat, strap in, and by the time it is ready, they are ready. They start to taxi in a minimum time, then.

Senator GLENN. What minimum time are you talking about? One minute? Five minutes? Five hours? What is it?

General DEMPSEY. [Deleted.]

Senator GLENN. Mr. Chairman, may I ask some questions at this point?

Senator EXON. Certainly. Go ahead, Senator Glenn.

Senator GLENN. What are you talking about from getting a signal to takeoff?

General DEMPSEY. From signal to takeoff?

Senator GLENN. Yes.

What is the time interval there before you actually have planes in the air?

General DEMPSEY. [Deleted.]

[Charts deleted.]

The en route portion, of course, is planned because of the ranges and fuel involved, and aircraft refueling. A lot of time and effort goes into that.

[Deleted.]

The one we are talking about today specifically is the red line from [deleted].

[Charts deleted.]

[Deleted.]

[Charts deleted.]

[Deleted.]

[Charts deleted.]

[Deleted.]

In its element again, you see the B-1, 200 feet, 650 or so miles an hour, a very small radar cross section, and accurate weapons delivery, a combination that we feel makes for an effective system.

[Charts deleted.]

The capabilities of the aircrafts are shown here, and we take on [deleted] targets that we are directed to attack in the Single Integrated Operational Plan, as shown here in primary order.

[Deleted.]

I will talk about a couple of them specifically.

[Charts deleted.]

[Deleted.]

Sir, we feel it contributes to our Nation's deterrent posture.

Thank you, sir, very much.

Senator EXON. Thank you.

B-1B TEST STATUS

General HALL. Continuing, Mr. Chairman, what I would like to discuss now from the programmatic and test standpoints are the achievements that we have accomplished over the last year, and since IOC, initial operational capability of the B-1, and also show the current status of tests, those tests that are still in progress. Then I want to discuss a few of the remaining challenges that will face us.

OVERVIEW

Achievements.
Current status.
Remaining challenges.

These are a few of the achievements that I would like to scan through.

ACHIEVEMENTS

Completed final assembly of aircraft No. 100.
Deployed B-1Bs at four main operating bases.
Set 36 world speed/distance payload records.
Flew record 22-hour endurance flight.
Two successful operational readiness inspections.
Successful release of primary weapons:
  —SRAM launch: January 1987.
  —ALCM launch: November 1987.
  —MK82 conventional: December 1987.
Arctic deployment—"Arctic Bandit".

We have completed final assembly of aircraft number 100. It has flown some of its acceptance test flights. It is scheduled to be delivered in June. We believe it will be delivered, probably at the end of April, ahead of schedule.

We have deployed the B-1Bs to the four main operating bases that General Dempsey showed.

We set 36 world records for distance and payload, over 1,000 and 5,000 kilometer courses. We have also flown with an operational crew a 22-hour mission out of Dyess, taking off at [deleted] and with five air refuelings at high gross weight, up over in the North Polar region, and demonstrated very fine accuracy in the navigation system, and, of course, showed that a crew of four can stay in the aircraft and perform satisfactorily over that long period of time.

There have been two successful operational readiness inspections. Those are very rigorous tests of the whole capability to support the aircraft—maintenance, operations, command and control. We had the successful release of those weapons, as shown—the Short Range Attack Missile, the ALCM, and by the way, that SRAM launch, the one in January, resulted in a [deleted] on the target, [deleted].

The ALCM was [deleted] from the target, and we have delivered MK-82 conventionals out of two bays. We are working on the third bay test now, and in tests—where we will show you some videotape in a moment—[deleted].

Finally, in the Arctic deployment, two B-1s were taken by operational crews from SAC in February, up into Alaska, and operated in the cold regions on the snow-packed runways where, again, we saw very fine results of the inertial navigation systems, and a good operation and no problems that were not beyond the norm in operating in that kind of environment.

I would like at this time to show you just a short videotape of some of the activities that have gone on.

[A videotape was shown.]

General HALL. Here you see a series of events from takeoff through landing. It shows you some of the capabilities that are being tested. Most of this is in the development test work down at Edwards.

This is a typical takeoff, and in this case, we are doing minimum interval takeoffs, as General Dempsey mentioned, [deleted].

Here is the second B-1, coming off from there in just a moment, behind the first, and starting the first separation that he showed on his charts, where they all get to a safe area to exit the field.

No problems were encountered, and with the afterburner, they had excellent performance in getting the aircraft off.

The flight control area work continues. We are working now on the stability enhancement feature of the aircraft, to allow it to go to higher gross weights and retain a high maneuverability for the terrain following portion of the flight.

This [indicating] is refueling off the KC-10 tanker. I know there has been quite a bit of discussion about the difficulty in handling the aircraft. But I have flown it myself, refueling, the B-1A and the B-1B. In my view it is far easier than any other aircraft of this size.

As you can see, he is very stable and moving in. The boomer in the KC-10 will put the boom into the receptable, which is right ahead of the windshield area. It is in now, and we will start transferring the fuel.

These are in-flight icing tests, where we use a KC-135 and water nozzle. We actually spray water at altitudes above the freezing level, and when it impinges on the aircraft, we see what the effects are.

In this case, we are doing the windshield region, to see if it adheres and if it causes any problems. We are doing icing tests as well in the wind tunnel down in Tennessee, at the Aeronautical Engineering Development Center to look at the buildup of icing in the intake of an engine. We actually have a complete intake installed inside of a wind tunnel to learn what we need to do to keep ice formation from going inside the engine.

Terrain following work is progressing extremely well. We are down to 200 feet in what is termed "soft ride" and 300 feet at "hard ride."

That is a very aggressive terrain following job for an aircraft of this size, and the work that has been done since IOC has been continuously improving the displays, the pilot views and the ability of the system to fly in operationally at that mode without any serious problems.

Of course, that is a tremendous advantage for the aircraft, in staying out of view, below the radar systems, and behind the hills.

We are also looking at the chaff. This is chaff being expelled from the system, which is automatically tied to a Tail Warning Function. This is slow motion, but these are flares coming out as well. They are tied into that system as well. It detects the presence of a missile in-bound and automatically, without the crew participating, ejects flares to protect it from IR weapons or chaff, against radar missiles.

This is a low level weapons release, the one I described, the 56 MK-82s. Those are 500 pound bombs, with a drag device called a balute that opens on the back, and this is shown in slow motion. Again, it is only 2 seconds for a complete drop sequence.

These are bombs, in a string approximately [deleted] with the blast effect of each bomb essentially next to each other.

Senator GLENN. Does that give you any control problems, when you dump that much weight out?

General HALL. No, sir.

This is a release of a nuclear, simulated nuclear weapon. This one impacted approximately [deleted] from the target center.

This is release of the Short Range Attack Missile. You will see the motor light right about now.

This is a weapon with approximately a [deleted].

This is a SRAM-A, which has been in the inventory for some time.

Here you can see the impact was [deleted] from the target center.

This is the Air Launched Cruise Missile being released from inside the bay. This is in slow motion.

I have chased these in an F-4, and it happens very rapidly. As it comes out of the bay, it's fins and wings open and then you will see the motor ignition and engine start; that is really about 2 seconds in total time.

Again, this weapon came extremely close to the target in final impact. This is the delivery of a mine, a MK-36 mine, which you will see come out of the bay, at high transonic speed and low altitude.

This is to show you that down at approximately 200 feet the aircraft is there and gone in a very brief period of time. That is all real time. Again, this is to show you a cross section of the kind of test work that has been going on over the last year.

Now I will resume with the slides.

B-1B CAPABILITIES DEMONSTRATED AIR VEHICLE

Take off performance—minimum interval takeoff.
Range.
Flight controls:
  —Basic.
  —SIS I.
Air refueling:
  —KC-135
  —KC-10.
Radar cross section.
SIOP capabilities—demonstrated.

Now, Mr. Chairman, I would like very briefly to go over some of the capabilities that have been demonstrated.

I will spend the majority of the time on the defensive avionics system. But I just want to give you a brief picture of where we stand on all the other systems.

With respect to takeoff performance, it meets all of the requirements. Again, we have done the minimum interval takeoffs and demonstrated the [deleted].

The flight controls are being improved. We have completed all the basic work. What we call the "Stall Inhibitor System One (SIS I) has been completed, and those aircraft that required it have been modified and are available to Strategic Air Command.

The Stall Inhibitor System number two, which provides an increased gross weight capability for the aircraft is approximately 50 percent complete, and the Stability Enhancement Function, which will give us the full capability of the aircraft, the full potential, has been started, and will be completed in the next year.

Air refueling has been done on both tankers without any difficulty. The radar cross-section has been measured and meets our expectations.

So, the bottom line on the air vehicle overall is it meets the SIOP capabilities required for the Strategic Air Command.

B-1B CAPABILITIES DEMONSTRATED OFFENSIVE

Inertial navigation system—very accurate.
Radar:
  —Tanker identification.
  —Precision aiming.
  —Weather avoidance.
  —Integrated with terrain following.
Weapons delivery.

The offensive system, the inertial navigation system, has proven to have excellent accuracy. In fact, based on the independent operational test organization for the Air Force, it exceeded all of the requirements for accuracy in the basis INS modes.

So, overall, there is a very accurate capability there.

The radar tanker ID function profile shows very good performance, and we have a precision aiming capability with the synthetic aperture radar, called a high resolution ground map, that provides incredibly accurate information for the navigator to upgrade his systems.

Weather avoidance is satisfactory. One of the most difficult tasks faced on the offensive system was to integrate the terrain following with the offensive radar system, and that has improved tremendously over the period of time that we have been in test.

Finally, the weapons delivery accuracy, as I indicated earlier, has been very good. There have been 36 releases of nuclear shaped weapons, and the CEPs have been [deleted] across the board.

Senator EXON. General, I want to interrupt you for just a moment. Senator Glenn has to leave, and he has a question.

I am pleased to recognize him at this time.

Senator GLENN. I will just take a minute. I'm sorry to have to interrupt, but I must leave.

This is off the record.

[Discussion off the record.]

Senator GLENN. On ECM, you mentioned that there were earlier strikes going. Will we still have the ECM out? I hope you will address the problems of ECM sometime, but not now.

Next, right from the start of this thing, we have had an end emphasis on the SIOP on the nuclear, and we are going to have to go to war first probably with conventional weapons.

We have had to beat that into people, and I was one of the people fighting on the floor for the B-1 over here, when we couldn't even get information at one time about the test program for the conventional.

I think because of some of that attention you did get going on that issue somewhat.

When I was out there at Edwards, we did the lay-downs, and you have the diagrams here. But I think, even in your statement, this has not been an atypical attitude, when it says, "capable of carrying nuclear weapons on 180-inch launchers and the Common Strategic Rotary Launcher, as well as conventional weapons."

That, too often, has come second best.

Now if you guys go to war with that thing, I suppose you are probably going to have to use conventional before you use anything else. So I hope you are coming along with that conventional component and keeping that foremost in your testing out there, because that is probably what we are going to have to use first.

So I just hope some of those things get addressed.

I am sorry, but I do have to go.

Senator EXON. I understand, Senator Glenn. We appreciate your dropping in.

Senator GLENN. One other thing.

Your availability is up 14 percent, but you didn't give a total. What does that mean? It is up 14 percent, but that does not mean much to me. Are we running 60, 70, or 80 percent availability?

General HALL. No, sir.

We are still building up the spare support and all, and we are at [deleted]. The goal is [deleted] for the IOC phase.

Senator GLENN. Well, okay. [Deleted.]

General HALL. [Deleted.]

Senator GLENN. Thank you, Mr. Chairman.

Senator EXON. Thank you.

Please proceed, General.

General HALL. May I have the next slide, please.

I mentioned this already, so I will just touch on it lightly now.

B-1B CAPABILITIES DEMONSTRATED OFFENSIVE—Continued

Terrain following tests completed:
- —200-ft soft ride.
- —300-ft hard ride.
- —67- and 55-degree wing sweep.
- —Stall inhibitor system [SIS I].

Available for wartime use since IOC.

Terrain following released for training:
- —200-ft—flat and rolling.
- —500-ft—mountainous.
- —day visual flight rules.
- —67- and 55-degree wing sweep.

In the terrain following tests, we have made tremendous progress. I think, if you can visualize this aircraft at 200 feet above the ground, at [deleted] and precisely following the terrain, it is a monumental task and it is coming along very, very well. We are very pleased at the progress that has been made.

We are at 300 hard ride now, and we are going to make one minor change. In hard ride, the aircraft, when it approaches a ridge line and comes down the back side, it does it very aggressively. That is bothersome to the crew over a long period of time.

We are going to soften that push-over a little. It is not hazardous. It is not an emergency. It is more crew comfort than anything else because, over a long period of time, that push-over is very difficult for the crew. They don't enjoy it—I'll put it that way.

So we are going to soften that, but not allow it to balloon up where it would affect the survivability.

We have done it at the various wing sweeps that the Strategic Air Command will need, and we have done it with the initial Stall Inhibitor System.

It has been available for wartime use since IOC, but we have certainly made improvements that are going to enhance the confidence of the crews in their ability to survive in that environment.

So, for the terrain following right now, the values are listed there [indicating]. They can work at 200 feet at flat and rolling, at 500 in mountainous, such as the Sierras, and under day visual rules, I will describe some of the things we are going to do to get that across the board here in just a moment.

I will say that, as you are aware, we had the bird strike. We now have modifications on six of the aircraft. So those aircraft are cleared back into the low altitude regime for training.

B-1B TESTS REMAINING OFFENSIVE

Navigation:
  —Statistical confidence.
  —Backup modes.
Radar:
  —Regression tests.
  —Backup modes.
Terrain following:
  —Heavy weight.
  —Night weather.

The other aircraft will be modified during the year.

The remaining tests in the offensive area are shown. We have some navigation work to do to build up our statistical confidence in its accuracy. We have some backup modes to exercise.

The same in the radar. But, basically, those areas are cleared.

In terrain following, we are going to do the heavy-weight. To do that, we need the Stability Enhancement Function so that we can take the aircraft up to those high gross weights.

The night and weather will be done when we get one more block of software in the aircraft. But that will be in August.

Now, the defensive system—as I indicated, I will spend the majority of the time on this.

B-1B DEFENSIVE SYSTEMS PROGRAM

Early performance—inconsistent.
Configuration stabilized—MOD 0.
MOD 0 lab evaluation—June 87—bounded problem.
Phased recovery plan:
  —Fix software.
  —Fix hardware.
Recovery Milestones:
  —MOD 1 block 4.0 (software).
  —MOD 1 block 4.1 (software and firmware).
  —Tail warning function (software and hardware).
  —MOD 2 block 5.0 (software and hardware).

The early performance was clearly inconsistent. We had a lot of software, or computer resets, which disrupted the system. [Deleted.]

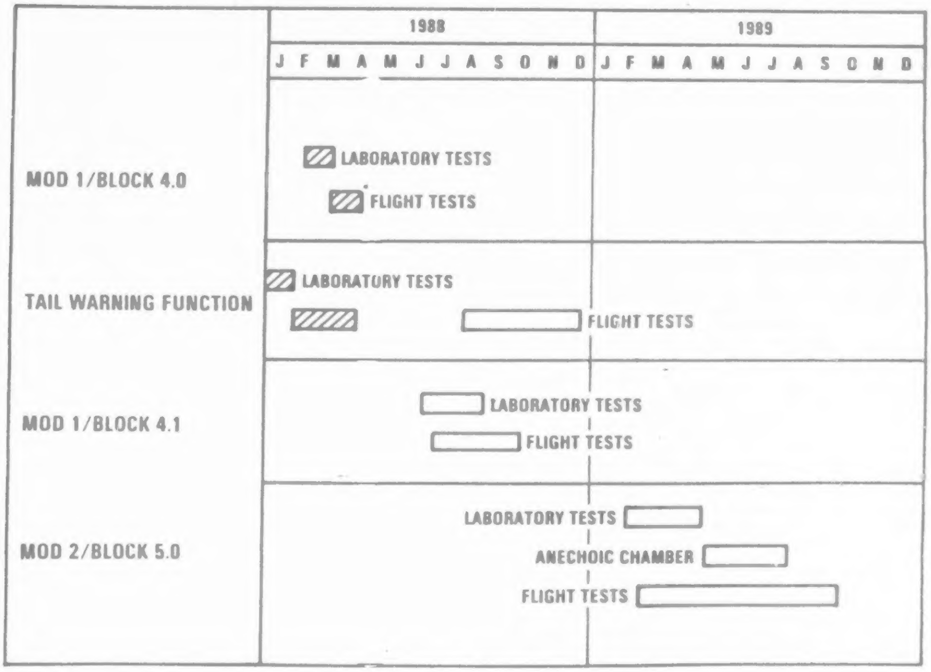
As a consequence, we stabilized the configuration at what we describe as MOD-zero, and we started that with aircraft 46 in the production line, and we subsequently retrofitted aircraft 19 through 45. The earlier aircraft will be modified to the upgraded configuration.

B-1B CAPABILITIES DEMONSTRATED DEFENSIVE

MOD 0 lab evaluation.
Tail warning function:
  —Completed on schedule.
  —Meets criteria.
MOD 1 block 4.0:
  —Completed on schedule.
  —Data in analysis.

We have evaluated that system and found the problems. We did that last year, in June, and we found some 270 software and hardware problems.

ALQ-161 TEST SCHEDULE



We then established a phased recovery plan, as we show there, and the process was this. Let's fix the software, because it is masking hardware problems, then get into the hardware and fix it. The recovery milestones are shown there, and they consist of MOD-1/Block 4.0, which will be the software fix, MOD-1/Block 4.1, which is software and firmware, or what they describe as PROMs. We will get the tail warning function done, both aspects, software and hardware, and then get to the MOD-2/Block 5.0—these are all numbers, but that is the baseline defensive system capability the Strategic Air Command requires.

Here you see the schedule that we showed last year. It has not changed. You can see by the line that we have completed the MOD-1/Block 4.0 work, and we have completed the laboratory test, the first phase of flight test on the tail warning function, and those were completed on schedule.

The other two phases are shown, and you can see that the final test on the defensive system will be completed in September of 1989.

Again, that schedule has not changed.

I would like to come back to the earlier slide, please, just one slide back.

Let me just indicate the work that has been done. What I would like to do is show you—and I apologize, Mr. Chairman, for not getting the bimonthly to you on time. We wanted to get 2 months of tests, and it takes time to get the analysis. That bimonthly has been completed. It is in coordination.

I would certainly hope that it is going to be here next week, and we will have the subsequent bimonthlies to you on time.

I will take the knock for that. We have just been pressing hard to get the tests done and get the process moving, and we are late.

I will apologize to the chairman and the committee for that. We will get the subsequent ones to you on time.

Senator EXON. Were you aware that these reports were past due, General? Or were they just ignored?

General HALL. No, sir. It was not ignored. We did not start the tests until January, so to have results to present to you, it takes time to get the laboratory tests together.

Senator EXON. So, you got behind on your schedule, which made the reports late. Is that what it came down to?

General HALL. Yes, sir—to have meaningful information to present in the report.

I would like to show you now some of the information that will be in the report.

Senator EXON. Before we go into that, General, Senator Thurmond also has a time crunch this morning, and he has a question or two to ask.

I would be glad to recognize you at this time, Senator Thurmond.

SPEED OF THE B-1B

Senator THURMOND. Thank you very much, Mr. Chairman.

General Dempsey, what is the speed of the B-1B, the maximum speed?

General HALL. In the low altitude regime, it is approximately [deleted].

Senator THURMOND. I can't hear you.

General HALL. It is approximately [deleted] in the low altitude regime.

Senator THURMOND. What is the minimum distance for takeoff?

General DEMPSEY. Sir, it depends on the gross weight of the airplane. It varies, depending on how heavy it is.

At the heaviest, it is about [deleted].

Senator THURMOND. Well, when you carry the load that you are going to carry, what is it?

General DEMPSEY. It is about [deleted], sir. In that ballpark.

Senator THURMOND. All right, [deleted].

General Dempsey, how representative is the B-1B flight profile just presented of SIOP missions that are now planned for the B-1B?

General **Dempsey**. Sir, it was very representative. [Deleted.]

I just took out a few things that would have raised the classification level and made if difficult to work. But those are actual targets. [Deleted.]

Senator **Thurmond**. [Deleted.]

General **Dempsey**. Yes, sir.

[Deleted.] We now have some more B-1s. I cannot tell you the later numbers. But that is where we started the year.

Those are the kinds of sorties. Some of the airplanes have up to [deleted] and a couple have [deleted].

Senator **Thurmond**. General Hall, how do you respond to Mr. Krings' report on the status of the ALQ-161?

General **Hall**. Sir, I am going to address that in detail in a moment.

But we are going to achieve on this schedule that I just showed, the ALQ-161 capability that SAC requires. We will have that by September 1989.

So, we will understand it. If we find problems in this test, we are going to do everything we can to correct them and provide the technical capability required.

B-1B TESTING PROGRAM

Senator **Thurmond**. General Hall, what would be the effect on the B-1B testing program to accommodate development of the ALQ-172 for the B-1B within the requested level of funding for fiscal year 1989?

General **Hall**. Sir, we only have money to do within the baseline and within the funds available the 161 system, as we showed you on the schedule.

To add the ALQ-172 to the B-1 has been estimated to cost up to $2 billion.

That would take additional funding, and, worse yet, it would take a considerable amount of time to then go through all the development and testing to integrate that into the B-1, which would delay having a capability that would be required by the Strategic Air Command, as the threat becomes more capable in the 1990s.

Senator **Thurmond**. General Hall, what are Air Force plans for equipping the B-1B with air launched cruise missiles, and what effect will START have on these plans?

General **Hall**. We have the capability to put air launched cruise missiles, as we showed. [Deleted].

I have no details at this time as to proposals in START. But we are certainly waiting to hear what those decisions will be, and it also effects the maximum amount of testing that we do because it could set a precedent with air launched cruise missiles.

Senator **Thurmond**. Is the Air Force expressing itself vigorously to those in charge of the START operation?

General **Hall**. Yes, sir.

Senator **Thurmond**. I think that is important. It is too late after it is done.

General **Hall**. Yes, sir.

Senator **Thurmond**. General Hall, there are indications that the Air Force is considering [deleted].

General **Hall**. Sir, I will have to provide you an answer for the record on that. I am not aware of [deleted].

[The information follows:]

Cruise Missiles Numbers

Review of strategic roles and missions is a continuing process as we strive to maintain an effective deterrent and build a modernized force. Inherent in this process is achieving employment flexibility within the bounds of fiscal reality. While no decision has been reached yet on the ultimate size of the cruise missile force, no drastic reductions are anticipated. To enhance employment flexibility, the bomber force will employ all available cruise missiles, gravity bombs, and SRAMs to achieve the greatest measure of deterrence and military effectiveness.

B-1B DEVELOPMENT PROGRAM

Senator **Thurmond**. General Hall, how does the weapons system maturity process for the B-1B compare with other Air Force programs, such as the F-15 and the F-16?

General **Hall**. Sir, to answer that, the B-1 was a very concurrent development program, and the aircraft, as delivered at IOC, of course required continuing development.

But if you look at the total span of time to this point, the initiation of development to the point where we have a capability for SAC to meet its SIOP requirements, we have done that work in a very short period of time.

So, while development was going on and production was going on simultaneously, we have still delivered a product that meets the user's needs, and so, I will only say that the F-15 and F-16 had some continuing development to do after they were delivered. The degree to complexity of that may have been different. But, of course, this is a fairly, I will use the term "sophisticated" system, and the development of that system has progressed after the delivery.

BASELINE ELECTRONIC WARFARE CAPABILITIES

Senator **Thurmond**. Dr. Woodruff, what conclusion have you come to with respect to the potential to achieve baseline electronic warfare capabilities from the ALQ-161 system?

Should we be turning now to alternatives to the ALQ-161, as suggested by Mr. Krings in the House Armed Services Committee?

Dr. **Woodruff**. I will discuss that more in detail——

Senator **Thurmond**. Speak up so that we can hear you, please.

Dr. **Woodruff**. I will discuss it more in some detail in a few minutes, but let me just summarize.

We believe the Air Force current plan is a good one, and you will see that their plan calls for the ALQ-161 to be fully capable in 1990-91.

Relative to other alternatives, we have recommended to the Air Force that they have a low level effort, looking at backups as an insurance policy.

Right now, we see no reason to turn to another system until we have done more testing on the ALQ-161.

It is the best way to proceed.

B-1B MODIFICATIONS

Senator THURMOND. Dr. Woodruff, is the Department of Defense considering modifications to the B-1B in the future to enhance its strategic or conventional capabilities? What improvements in your judgment have the most potential?

Dr. WOODRUFF. We have always said that we will need to continue improving the ECM on all systems, especially the B-1.

We see a need to improve the B-1. [Deleted.] The Air Force is considering what they would do on that.

Right now, there is no money in the budget to work on that system.

Senator THURMOND. Dr. Woodruff, some have suggested that the B-1B be assigned only to stand-off cruise missile carriage missions. What is your reaction to such a suggestion?

Dr. WOODRUFF. Well, we have already seen from General Dempsey that the B-1B does a good job of penetrating today, and if the ECM is fixed, it will do a good job of penetrating tomorrow. [Deleted.]

Senator THURMOND. Mr. Krings, I just have a couple of questions for you.

Senator EXON. Sir, would you please not go into too much detail? I would like to get their statements on the record, if I could, Senator Thurmond. I just wanted to accommodate you to the extent that we can.

Senator THURMOND. I will just make this as short as I can, and I just have two questions remaining. That would be all.

Senator EXON. Fine.

Senator THURMOND. Mr. Krings, [deleted].

Mr. KRINGS. [Deleted.]

Senator THURMOND. Have you recommended any alternatives?

Mr. KRINGS. No, sir, we have not.

I don't think it is prudent for us to suggest weapon systems, but more properly, to suggest operational capability needs, as opposed to specific systems.

Senator THURMOND. [Deleted.]

Mr. KRINGS. [Deleted.] But it is clearly ineffective against some defenses. [Deleted.]

Senator THURMOND. [Deleted.]

Mr. KRINGS. [Deleted.]

Senator THURMOND. This is my last question.

ALQ-161 FLIGHT TEST PROGRAM

Mr. Krings, based on your summary report, is one to conclude that completing the flight test program on the ALQ-161 would be a waste of money?

Mr. KRINGS. No, sir, absolutely not. It absolutely should be completed.

Senator THURMOND. Thank you, Mr. Chairman.

Senator EXON. Thank you very much, Senator Thurmond.

Now, let's see, General, you were about to go into a presentation, I believe.

General HALL. Yes, Mr. Chairman.

TEST OBJECTIVES: TAIL WARNING FUNCTION

Missile detection—measure the ability to detect closing missiles.
False indications—measure the false indications.
Chaff and flare dispense signal—verify that detection of a closing missile produces a countermeasure dispense signal.

I would just like very quickly to tell you a little bit about what we have seen in the tail warning function.

May I have the next slide, please.

On this slide [indicating], these are the three areas where we looked at the tail warning function. One is an ability to detect that an incoming missile was after the B-1. Second, are there false indications which could expend your expendibles—your chaff and flares—unnecessarily. Finally, does it give a chaff and flare dispense signal when it should?

[Chart deleted.]

To evaluate that—and this is straight out of the test plan that was sent to Congress in February, we set criteria.

The top line is fully successful. This is partially successful [indicating], and this would be unsatisfactory [indicating].

We rated both in laboratory tests and in flight tests.

In this case, missile detection, which is the first line there [indicating], [deleted] to be fully successful in the laboratory. The tail warning system did. [Deleted].

In flight test, it detected [deleted]. So, it was just less than the fully successful criteria. It uses partially successful on those tests that I showed on the earlier schedule.

[Chart deleted.]

In the next slide, you see false alarms or false indications. This is the criteria for fully successful. It fully met it in the laboratory, and in the flight test, out of the whole series of tests, [deleted].

[Chart deleted.]

In the third case, chaff and flare dispense signal was provided [deleted]. Both—and this is automatic, with no crew member involved—in the laboratory and in the flight test environment.

So, we are satisfied with this early stage of testing. There will be more flight testing to come on the tail warning system.

The other phase, the MOD-1/Block 4.0 tests that have been completed, for that we do not have all the data analyzed yet. It is a complex data set. We should have that shortly.

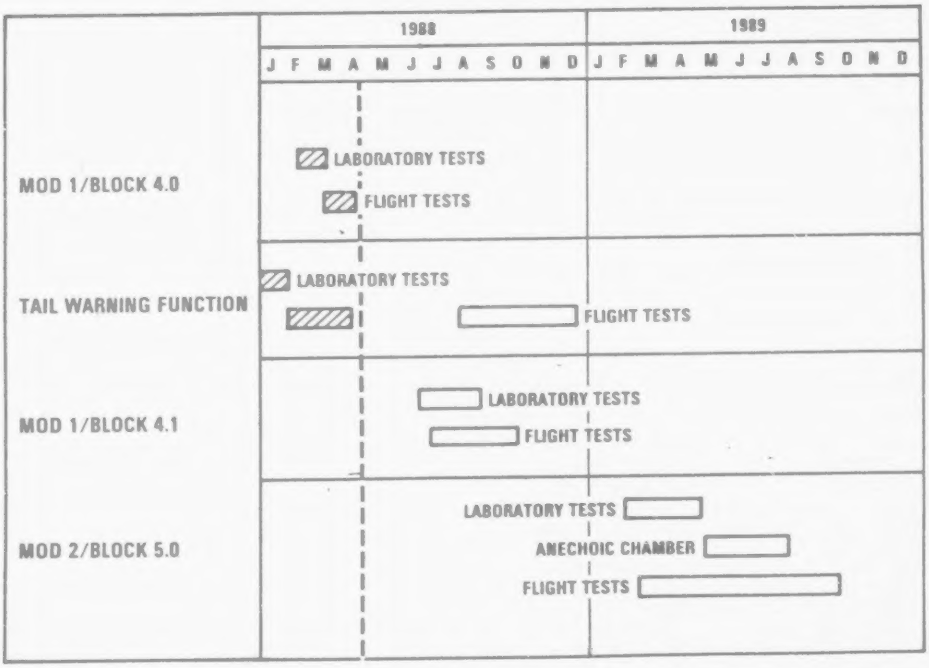
TEST OBJECTIVES: MOD 1/BLOCK 4.0

Receive/Process Functions.
[Deleted.]
Computer/Processor Performance.
[Deleted.]

But the areas that we will look at, similar to what we showed from the tests there, are those three primary areas to ensure that those systems function in a satisfactory way to provide the operational capability required by SAC.

So, that information will be provided as soon as we can get it.

ALQ-161 TEST SCHEDULE



Again, this is the schedule [indicating]. We are doing everything that we can to stay on that schedule.

B-1B Capabilities Demonstrated Weapons

Nuclear-gravity-weapons:
  —Precision bombing.
  —Baseline weapons certified.
Missiles:
  —SRAM—certified.
  —ALCM—internal.
Conventional (2 bays):
  —MK 82.
  —MK 36.

Finally, just very briefly on the weapons, I think I have already mentioned this, but we have met all the requirements on the accuracy for nuclear gravity weapons. [Deleted.]

We have dropped them up to [deleted] with less than a [deleted] CEP. The baseline weapons are now certified on the aircraft.

The SRAM is certified. The Air Launched Cruise Missile we have done the internal bay drop, and finally, conventional weapons, we have completed the drops that I showed you in the video—the MK-82s and the MK-36s, or mines.

This [indicating] is a release of one of the simulated strategic nuclear weapons, the B-83, up at Tonapah. Here is the SRAM launch [indicating], done at [deleted] above the ground, and this is the MK-82.

So, I think we have covered everything from the guided weapons to the nuclear gravity drop weapons, and also the conventional weapons.

Senator EXON. Are you saying, General, that everything is right on schedule, regardless of the type of weapon being used? Is that what you are saying?

B-1B TESTS REMAINING WEAPONS

Nuclear-gravity—CSRL.
ALCM external.
ACM internal and external.
MK 82 (3 bays).

General HALL. We are on schedule. We still have these tests to do—the nuclear gravity off the Common Strategic Rotary Launcher. We have work to do there. The ALCM we have not carried externally. We have not completed that work. And the Advanced Cruise Missile, we have not done either internally or externally. There is still work to be done there.

Finally, on the MK-82s, we have completed two bays, and we have started the three bay tests.

I was out at Edwards a week ago Monday, and we had one release from a three bay configuration. That work is continuing now. As soon as we finish that, then we will have the MK-82 release work done.

SUMMARY

Significant progress has been made.

Fiscal year 1989 B-1B RDT&E funding completes baseline development and testing:

- —DT&E and IOT&E complete in fiscal year 1989.
- —FOT&E (1) complete in fiscal year 1989.
  - Except defensive systems.

Development and testing will be required throughout life of aircraft based on evolving threats and missions.

In summary, Mr. Chairman, we have made significant progress, I believe, since IOC, and also in the last year. We have done it within the original planned RDT&E funding for the program, and we expect to meet the baseline requirement with that funding.

The development test and initial operational test, which was conducted out at Edwards, principally, will be completed in fiscal year 1989. The follow-on test, phase one, will be completed in fiscal year 1989, with one exception, and that is the defensive system. We will complete the development testing in 1989, but then we will have to retrofit the aircraft for SAC. They will do follow-on tests with those retrofitted aircraft on the defensive system.

Last—and Dr. Woodruff made this statement, so I will only reinforce it—we would expect with the B-1 that modifications and testing will be required throughout the life of the aircraft, just as we are doing with our current fighters, the F-15 and the F-16, to ensure that they stay in step with the threat and, where technology will allow us, to enhance the survivability and the probability that we can put weapons accurately on target, both conventional and nuclear. It is something that has to continue on in any modern aircraft program.

Sir, we are available for your questions at this time.

[The prepared statement of General Hall follows:]

Prepared Statement of Maj. Gen. Michael D. Hall, Director of Strategic, SOF and Airlift Programs, Assistant Secretary (Acquisition)

Mr. Chairman and members of the committee, thank you for the opportunity to discuss the B-1B program with you. During the last year, there has been considerable effort and progress in the B-1B program and today I would like to highlight some of the achievements of the last year and specifically address test program status and accomplishments.

The production challenge has been met. The B-1B program has sustained rate production of four aircraft per month since November 1986 and is now operating out of four main operating bases: Dyess AFB, Texas; Ellsworth AFB, South Dakota; Grand Forks, North Dakota; and McConnell AFB, Kansas. The 100th B-1B rolled off the production line in January 1987 and flew its first flight this month.

The deployment of any major weapon system poses tremendous logistics challenges. During the past year we have worked those challenges, and are now seeing progressive maturing of the B-1B logistical system. Aircraft availability is still below desired levels, but has increased 14 percent since the Initial Operational Capability was achieved in September 1986. Similarly, maintenance man-hours per flying hour has been reduced from over 100 to 56. An extensive Central Integrated Test System maturation effort has reduced aircraft system false alarm codes from 120 to less than 3 per flight. The bottom line is that the system is maturing and Strategic Air Command is meeting its training requirements.

Operationally, the inherent capabilities of the B-1B are being realized. In April 1987, an Air Force Operational Test and Evaluation Center (AFOTEC) crew flew a 22 hour mission to demonstrate the B-1B Single Integrated Operations Plan (SIOP) capabilities. The flight profile included takeoff and air refuelings at heavy SIOP gross weight, high latitude navigation, and weapons programming. In June, an AFOTEC crew from Dyess AFB successfully performed the first operational SRAM launch from a B-1B. In July and September, the B-1B set 36 world records for speed, payload, and distance by flying a 1000 and 5000 kilometer course at an average speed of 650 miles per hour. Over 12,000 hours of operational flying have been flown and this past fall, Dyess and Ellsworth AFB both successfully passed their operational readiness inspections. In short, the B-1B is fully integrated into the SIOP and is capable of performing its assigned missions.

The operational suitability evaluations at Dyess AFB and Edwards AFB are progressing on schedule. Effectiveness testing was initially slow, but has gathered momentum as the development efforts have been completed and released to SAC for operational use. Initial Operational Test and Evaluation (IOT&E) and Follow-on Operational Test and Evaluation (FOT&E) with the exception of electronic countermeasures are scheduled to be completed in fiscal year 1989.

Primary developmental test efforts over the past year include flight controls, terrain following, weapons delivery, and electronic countermeasures. Flight control testing on the Stall Inhibitor System (SIS I) is complete, and the capability was released to SAC on schedule in December 1987. The retrofit on aircraft number 2 through 18 will be complete this month. The Stability Enhancement Function (SEF) tests have begun and will continue through February 1989 and test of the stall inhibitor portion of SEF is 50 percent complete.

Terrain following tests have progressed well. Testing is complete through 200 foot soft ride and 300 foot hard ride. Flight test results with the basic aircraft, SIS I flight controls, electronic counter-countermeasures, and 55 degree wing sweep have been good. To improve crew comfort, the software is being modified to smooth the aggressive ride encountered with the hard ride selection. Flight tests will resume in July 1988. Terrain following at 200 foot soft ride over flat and rolling terrain and 500 foot in mountainous terrain was released for training in March 1987.

The B-1B is a versatile highly accurate weapons delivery platform capable of carrying nuclear weapons on 180-inch launchers and the Common Strategic Rotary Launcher as well as conventional weapons. Testing is complete on the B-61, B-83 180-inch launcher, SRAM, internal air launch cruise missile (ALCM), and MK 82/MK36 two bay configurations. Based on 36 nuclear weapon shape releases, two live SRAM launches and numerous captive carry launchers, the B-1B meets or exceeds it weapons delivery accuracy requirements. The first ALCM launch occurred in November 1987 with an excellent score. Several challenges still remain with the external cruise missile carriage. However, the Air Force is actively working these issues.

Electronic countermeasures is the remaining factor in the penetration equation. The current system provides a capability today, but further development is required to fully realize all of the ALQ-161's penetration capabilities. These development efforts are proceeding on track. Last summer's laboratory evaluation of Mod 0 thoroughly baselined and bounded the development requirements. To complete the development efforts, we have structured a four step recovery plan. The test plan for these efforts was submitted to the Congress in February.

The ECM tests outlined in the plan are on schedule. The tail warning laboratory test were successfully completed and met the stated criteria. The flight tests of that function have since been accomplished with good results. The Mod 1 Block 4.0 evaluation has also been completed. The flight and lab data is currently under analysis and will be reported in forthcoming bimonthly reports.

At this time, I have a short briefing and video on the B-1B test status. At its conclusion, I will be happy to answer any questions you may have.

Senator Exon. General, thank you very much.

Mr. Krings, I believe it would be proper for us to go to you now for whatever comments, suggestions, or presentation that you have to make. Then we will follow with Dr. Woodruff and then have some general questions.

STATEMENT OF HON. JOHN E. KRINGS, DIRECTOR OF OPERATIONAL TEST AND EVALUATION

Mr. Krings. Yes, sir. I don't have a prepared statement, but I would like to make just a short, brief expression.

We have two annual report versions, one of which is just being distributed, which is the unclassified annual report. Quite truthfully, as you will see, we have two different views.

It is the same subject, but we have softened it a little bit, if you will, in the unclassified report. We did not find it comfortable to express to those who don't get classified reports some of our inner thoughts. I guess that is the best way to say it.

I guess I would characterize our expression in our annual report as a word of caution, if you will, about the ultimate capability of the ECM system. We are not in any way, shape, or form suggesting that we change our path at this point in time.

The 161 has not been given an opportunity to determine what its ultimate capability is, and we should not abandon it before it gets that opportunity because it is too far along and the integration problem is too large to try to change horses at this particular point in time.

But, we should, in our view, be looking at [deleted]. So we should be looking at that prudently.

The other thing I might mention is that, at one time, the Senate suggested that we report on this from time to time. The Congress' conference report directs that the Air Force report through OSD to you.

So, we do not have a direct responsibility to report to you on these activities. But we feel that we have an indirect one because we will eventually go into operational testing, and, without an insight to what is being done before the operational test, we really cannot forecast when and what the outcome of the operational testing will in fact be.

At this point in time, we are really watching the development testing, and at arms length. But we are looking at it for its impact on operational testing in the future.

The original Air Force February plan does deal almost completely with developmental tests, and very little with operational tests.

There have, in fact, been very few operational tests done on the B-1 to fulfill the operational test plan that was written by the Air Force. We are probably down at about the 7-percent level in the ECM system and probably not over the 40-percent level in all the operational testing for the entire weapon system.

So we really have not seen a lot of the results of the development testing in operational testing yet. But we are certainly watching so that we will have some idea what it is going to look like and whether or not the schedule will be capable of being achieved.

SUMMARY

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Except defensive systems.

Development and testing will be required throughout life of aircraft based on evolving threats and missions.

If I were able to put up General Hall's last slide, maybe that would be the easiest way to express our views.

While we are getting that, the question has always been and it keeps turning back to ability of the airplane to penetrate. I think that SAC has clearly expressed that it can. Both here last year and in the House, we have said over and over again that there is resident today in the B-1 penetration capability. There is absolutely no question about it, and it will increase as the B-1 is finished.

I would like to characterize the B-1 as not finished, rather than as needing to be "fixed," because, in most cases, we are not fixing a system that has been fully developed. We are still developing the systems to find out what they will, in fact, accomplish.

And so, in the case of the ECM system, the terrain following and the flight control system, they are truly still in development and have not yet been fully tested. So we are not really fixing it. We are finishing it.

To get back to Mike's slide, there has been significant progress. One would hope so, with the passage of time and the amount of money. There has been significant progress. There were significant problems to solve, of course, so we need significant progress.

The DT&E and the IOT&E will, in fact, be completed in fiscal year 1989. The "OT" part of that will include navigation, radar mapping, terrain following, et cetera. But, as Mike pointed out, it will not include the defensive electronic countermeasure testing because the development will only be completed in fiscal year 1989, and the operational testing of that system will begin after that.

That is why we suggest looking—and, again, I would underline looking at alternative systems—because we really won't have the true answer on the 161 with respect to its operational capability until the early 1990s. That is the first time we will be able to see it. We don't need to idle for that period of time not looking at something that we may, in fact, discard [deleted].

Development and testing of the ECM system will be required throughout the life of the aircraft. We would like to have it in such a needed and capable position that we would be continually developing and adding to the system. We would not want it to stop where it is. [Deleted.] That is really the only area in which we have a difference of opinion.

The progress in the development testing has not been miraculous, but it certainly has been significant, and it is certainly complementary. They are doing a good job, and the progress is not unreasonable at all.

It is just that in development testing, as we all know, we are just trying to make it work, as opposed to finding out for sure whether it really does. The type of testing that is done is generally done very dominantly by the contractor, and when you go out and drop a bomb, things are rather ideal.

So, while it proves functional capabilities, it does not prove operational capabilities. SAC has clearly proven the operational capability in a lot of areas, but it still has a way to go.

I guess that is all we are trying to do, to put things into perspective about the B-1's current penetration capability, which is absolutely there and will get better. The only concern that we have is that it is going to get more difficult as time goes by, and we want to ensure that we do have a system that is inherently capable of dealing with that improved difficulty.

Thank you.

Senator EXON. Thank you.

Dr. Woodruff.

STATEMENT OF DR. LAWRENCE WOODRUFF, DEPUTY UNDER SECRETARY OF DEFENSE FOR ACQUISITION (STRATEGIC AND THEATER NUCLEAR FORCES)

Dr. WOODRUFF. I do not have a written statement, either. Let me make a few comments which, in general, agree pretty much with what General Hall and Mr. Krings have said. As General Hall has shown, there has been substantial progress in almost all of the well-publicized problems.

The one significant remaining issue is the ECM system. General Dempsey has shown that you can penetrate today, but, in fact, we still need to get all of the capability for which that system was designed.

We have been as worried about this as you have since the problem surfaced over a year ago. I might go through what has happened with the Air Force and do that in the following way.

We have a Defense Science Board Committee reviewing the Air Force ECM development, and this has been on-going for almost a year. They have made a number of recommendations, and in almost every case the Air Force has responded quite well. They sort of go along the lines of what Jack talked about.

The first recommendation they made—and this was early on—was that we do not know what the real problem is with the ECM. We need to understand it more, and the current program that the Air Force had was not very good.

It recommended that the Air Force stabilize the program, configuration control the ECM system, and initiate a careful test program before making any fixes, especially laboratory test.

The Air Force response to that has been what General Hall showed you, what I consider a carefully laid out plan with distinct and measurable steps. So we are quite happy with that, although frustrated that it is taking so long.

The second thing that they pointed out was that the system is highly software-dependent, and that the Air Force should take special measures and have a targeting review of the ALQ-161 software and its management. And the Air Force in fact has done that.

As a result, the AIL management of the software program, has improved dramatically.

The third thing they pointed out is that the Air Force SPO, the program office—the integrator of this system—is relatively shallow in the ECM area. And they recommend that the Air Force bring on some contractors support, and the Air Force has brought on both Boeing and LOGICON, and the SPO is much more capable today in the ECM area.

Now, the fourth thing, which we have talked about briefly, is the DSB recommended that the baseline design, the architecture, appears reasonable. They saw no alternative than to go ahead and test, development test the 161, which all three of us have said.

On the other hand, they did recommend—and Jack and I agree on this—that a low level effort be done, an insurance policy if you will, to see if there are not other near-term alternatives in case disaster falls once their testing is under way.

The Air Force has been slow in doing this, and we are still pushing them in this area.

Fifth, as we all three have said, the ECM will always need to be improved as the threat changes. [Deleted.]

The DSB recommended that the Air Force put together an organization or a group to sort of plan the long term development of the ECM specifically for the B-1. The Air Force has been a little slow in doing this, too. But as General Hall said, they are obviously motivated to worry about this problem.

Finally, to help us understand independently, I guess, what is going on in this area, we have started our own efforts to develop a penetration capability, analysis capability.

We have brought out a couple of contractors to allow us to do independent analysis of the B-1 penetration capability. And we intend to do a fairly complex study looking at how the B-1 penetrates as a function of the improvements in the ECM system, as General Hall laid out over time.

We hope to have that initial result some time this summer. So we have taken a number of steps in our job as oversight of the Air Force.

I agree with both General Hall and Mr. Krings that the Air Force finally seems to be bringing this program under control. They have laid out a good plan, and we are all, I think, anxiously awaiting hopefully the success of the flight tests that are now beginning.

Senator Exon. Thank you very much. I appreciate your being as forthright as you can about this. I have a series of questions now, and I may direct them to one or other of the witnesses.

First, let me ask you, have any or all of you made similar presentations as you made this morning to the House Armed Services Committee?

General **Hall**. Mr. Chairman, not to this detail. We have talked funding principally with the House, and we have not talked the test progress in this level of detail.

Senator **Exon**. So is it safe to say that we have gone into this in much more detail here this morning than the House Armed Services Committee has asked you about or asked you to testify to as of now?

General **Hall**. Yes, sir.

Mr. **Krings**. I might add, Mr. Chairman, that we had one scheduled that I assumed would be very much like this with the House Armed Services Committee. We went over and had a meeting with them before that scheduled hearing, which it was unscheduled.

We presented the identical information as we are presenting here.

Senator **Exon**. What do you mean, it was unscheduled?

Mr. **Krings**. It was canceled.

Senator **Exon**. Oh, you were prepared to give it, but did not?

Mr. **Krings**. That is correct.

Senator **Exon**. Dr. Woodruff, do you have anything to add to that?

Dr. **Woodruff**. No. I was in the hearing with General Hall, and we just touched briefly on this issue.

Senator **Exon**. General Dempsey, do you have anything to add to this?

General **Dempsey**. No, sir.

Senator **Exon**. Mr. Krings, I am trying to get a handle on this to see where we are. In your last annual report, your agency said on the B–1B: "At this time, the most difficult program of the B–1B is that the electronic warfare and tail warning systems are unacceptable. Design efforts continue. However, the system has [deleted].

Mr. **Krings**. I would still stand by that and it is not a case of the progress that is currently being pursued in the 161. [Deleted] looking, and again underlying, looking at alternatives, [deleted].

That is really what we would like to be seriously looked at.

Dr. **Woodruff**. May I answer that?

Senator **Exon**. Certainly.

Dr. **Woodruff**. I have a slightly different view. Maybe it is just a matter of semantics. [Deleted].

Then that is a logical progression. So provisions have been made to do that. When I talk about alternatives, I am talking about the Defense Science Board in fact recommending things like [deleted] even looking at possibly other systems like the 172 as insurance policies in case we run into disastrous problems in the test program, which none of us expect will happen.

So I put those in those two boxes.

General **Hall**. Mr. Chairman, along that same line, I would like to try to develop a thought also, that there are multiple modes in which you can jam or defeat a system, and if a radar has a search mode, a track mode, and a missile illumination or guidance mode, it would be nice to deny him search, because then he could not track or launch. [Deleted.]

That would certainly be an advantage, rather than [deleted]. But what we are talking about is that total spectrum here of capability, and today we believe there is a capability to [deleted].

Senator **Exon**. Let me ask you this, Mr. Krings. In your annual report, you say: "Mod 1 is to correct most of the software problems and some incorrect [deleted]. Mod 2 is to correct the remaining hardware-software problems, and is scheduled to be completed in fiscal year [deleted].

Now, Mr. Krings, I guess what I keep coming back to is the real world that we live in, and in a few days this subcommittee will be faced with the B-1B R&D request for another $220 million.

Are you advising this committee not to approve these funds?

Mr. **Krings**. No, sir, absolutely not.

Senator **Exon**. OK, then. What would you recommend then that we do?

Mr. **Krings**. To ensure that there is in fact a conscious effort, a fair and unbiased conscious effort, to see if technically the ALQ-161, when it reaches the capability that we are reaching for right now, will in fact cover the threats.

If it will, we are fine. [Deleted.]

But I think that there should be an assurance that an open view is taken to look and see if we do need a follow-on system and [deleted].

And I do not mean the year 2010. I mean future, if it goes to war in a reasonable length of time. So they are not future threats way over the horizon. They are threats that exist today.

And the fundamental question is, should not these R&D monies, some of them or more of them, whatever the case may be, be assigned to a reasonable look at those systems that [deleted].

I would not deny the progress on the ALQ-161. Clearly, it is the real-time interim solution, no question about it.

Dr. **Woodruff**. May I add one thing?

Senator **Exon**. Certainly.

Dr. **Woodruff**. There is legislation from last year that said that we cannot talk about enhancements to the current system without coming back to Congress. That was the reason why, I believe, the Air Force added no money for enhancements.

Senator **Exon**. Well then, you are saying that you strongly recommend that we do approve the request for the $222 million? You think that is fundamentally necessary, but there is no guarantee whatsoever. We have no option but to go ahead and follow that course, is that what you are saying?

Mr. **Krings**. Yes, sir. I believe that you and we have a contract with the B-1 pilot that says we are going to give him the IOC airplane. That is what he signed up for, and I think our contract has not been completed. And we have to finish the B-1 and make it the IOC airplane.

But in the meantime, it is only prudent to be looking at that which is clearly not around the corner but here right now.

Senator **Exon**. General Hall, let me ask you this question. Mr. Krings in the annual report that I have cited says that several problems still exist for which there are no design concepts for correction, and that has been elaborated on somewhat during the statements here this morning.

To me, this means we have some problems that are too hard. We do not know how to solve them, even in basic principle.

Do you still have some avionics problems like that? And do you share his concerns and my interpretation of them?

General HALL. [Deleted.]

So there is an enhancement required.

Senator EXON. Mr. Krings, do you have anything to add?

Mr. KRINGS. I guess I would like to add to what SAC has said. We would like to reinforce the fact that it is an incredibly capable airplane. People who would fiddle with stopping the finishing of the airplane are wrong.

We must finish the airplane as we started it. It takes this money to accomplish that. But in view of the fact that it is such a capable airplane, it is clearly going to be around for a long time, and we should be laying the fundamental groundwork for its success and survivability and not overlook the fact that some systems are not capable of extension, that we have to look at alternatives.

But I certainly want to make certain that nobody thinks that the basic airplane is not capable, because it is. And being a one-flight expert, I would say that it is quite good from my one-flight experience. There are people in the room who have a lot more flights, and I think they would certainly say the same thing.

Senator EXON. So I guess what you are saying is it is a good aircraft, it can perform its mission. You think this additional money is necessary and should be authorized to see if we can make it even better?

Mr. KRINGS. Finish it and look at what it takes to do it better.

Senator EXON. Dr. Woodruff, why has your organization found it so difficult to give us a test schedule with enough detail in it? We could expect to see several testing milestones accomplished each month. A single schedule chart in the report signed by Dr. Costello does not allow us to show our House Armed Services colleagues or the public the milestones scheduled in advance are indeed being achieved.

The ability to set a schedule in advance and stick to it is one important element of demonstrated progress. Will the DOD prepare for us a more detailed plan and when might we expect it?

When I say these things, I want you to know that that is not necessarily my point of view, but I am trying to build a case for us to carry to the House Armed Services Committee.

And I hope you will understand that during these days of tight budgeting, those who have always felt the B-1B was a terrible mistake in the first instance are taking an awful lot of potshots at it today.

I am not in that group. I am a supporter of the B-1B. But with the budget constraints, I must tell you that we just need more and more better information to plan, so that we could show that things are moving ahead to offset what we hear over there all of the time, that there is no use spending more money on this airplane now; it might serve a proper role, but there is no use throwing a whole lot more money at it, and we want to put that money over here.

That is what we have run up against. That is why I am asking some of these questions.

Can you respond?

Dr. **Woodruff**. That is easy. I mean, we have asked the Air Force to provide you the second tier schedule, and as soon as they get it to us we will get it over here.

Senator **Exon**. They just do not have it?

Dr. **Woodruff**. It is a very simple thing to do.

Senator **Exon**. Dr. Woodruff, the second part of the building of congressional and public confidence, of course, is that the tests are done on schedule, to be successful tests rather than unsuccessful ones. You know, that is easy to say.

I am sure that no one likes to have successful tests more than you people who are directly involved in that. Our purpose in asking for a bimonthly report was to get the kind of good news at more frequent intervals, so that we could feed it out.

You are certainly familiar with how the media is interpreting things around here. They just love to hear bad news about programs, to say they are not going to work, and that we are wasting the taxpayers' money in proceeding.

So we need more good news, at more frequent intervals. But so far we have received no bimonthly progress reports. Does this absence of reports mean that there has not been proper progress?

Is the progress much slower than you had anticipated? When do we expect to start receiving these reports that hopefully will be more positive than some of the other things we have dealt with in the immediate past?

Dr. **Woodruff**. As General Hall said, we did not want to send you a blank report. We had to wait until we got some test results, and he has shown you some of those.

He showed me a report last night that you saw in brief. I think the results are positive, and that report will be over here, and we will hold to the bimonthly requirement.

Senator **Exon**. Another thing I would like to say here is that we have continually tried to get across to the Pentagon that, while we as much as they recognize that much of this has to be classified, sometimes we go so far in these classifications that we curb our chances of getting things through the Congress. Often we do not have enough information that is available to enough people or that we could tell enough people about it so say that we are making some strides and this is it.

So please keep that in mind.

Dr. Woodruff, you have heard me read from Mr. Krings' annual report. It contains phrases like [deleted].

Do you disagree with these assessments? If so, to what degree? What is the evidence that you would cite to support a different point of view?

Dr. **Woodruff**. We agree to the extent that we will not be sure about the capabilities of the 161 until we get into the flight test program, which has just started. I do not have anything else to say but that.

Senator **Exon**. I think I have just one last question. I would direct this at Mr. Krings and Dr. Woodruff. While you have said some things on this this morning, General Hall, after they comment I would like to have you summarize maybe once again.

B-1 AVIONICS

Dr. Woodruff and Mr. Krings, I would like to ask each of you for your views on what more the Air Force should or could be doing during the next year in the area of B-1 avionics?

Is there anything that we in Congress should be doing besides just authorizing the money?

Mr. KRINGS. I have a suggestion, that your relationship through OSD to the Air Force take somewhat the same character of some of these other programs that we are involved in, in which we have suggested that in order for the program to progress the Air Force would tell us—we would not tell them, but the Air Force would tell us—at what maturity rate they intend to achieve the ultimate capability.

We are doing this in the B-2 program, in the A-12, the C-17, and a few other programs, in which they outline—because it is their program and they must execute it—they outline what you have asked for in terms of this test plan.

In these other programs we plan to make the subsequent awards, milestone awards, based on that sort of maturity plan. They are doing it in a number of programs and doing it quite well, and it seems like it is an ideal barometer to measure progress.

And they have agreed, sort of pseudo-contractually, that they will achieve that in order to progress. So it is a potential technique that is not at all different from that which you really asked for in the first place. It is not a different plan. It is just a little bit more structured.

Senator EXON. Dr. Woodruff, do you have a comment?

Dr. WOODRUFF. I think you can really help with the communications problem. I mean, people have to understand that the B-1 is a very good aircraft and plays a very important mission today and it does penetrate.

You need to help us convince everybody, particularly the House, that the ECM systems are going to continually evolve. We will be continuing to ask for funds that will improve that system beyond the baseline, and we need everybody here to understand that.

It is a good system and it is going to continue to get better. You just have to help us.

Senator EXON. General.

General HALL. Mr. Chairman, the B-1 program has experienced challenges in many ways in its development, and particularly in electronic countermeasure systems. The Air Force has submitted a recovery plan for the B-1B ECM system to Congress in February. And as I indicated, those development efforts are proceeding on track.

And we expect to provide the American taxpayer what we promised, a fully capable penetrating bomber with a fully operational ECM system. And based on the results from development testing so far, there is no reason to abandon that present course.

And to finish, sir, the B-1B is available, it is ready now. It is in the SIOP planning that General Dempsey presented to you. We believe it will continue to serve in a very robust multi-role capability for many years to come.

Senator EXON. Thank you.

I just want to tell you, gentlemen, that we have a tough time getting good news around here. We had all the bad news about the B-1B. And as much as anything else, I scheduled hearings, open hearings, though most of our hearings are closed, like this one.

And Jack Chain brought in some of the crews that operated the aircraft and they testified, I think, on some of the key points about that tremendous aircraft. They said that if they had to fly a mission in the Soviet Union this afternoon the B-1 was the one they wanted to go with.

And it was all positive. But I do not believe there was a peep about it in the press or in any press. I mean, when the Armed Services Committee schedules an open hearing, they are skeptical anyway; and second, when they heard that we were having the SAC commander in with pilots on the B-1, they were pretty well convinced that you were not in here to destroy a program, so they were not interested in it.

That is why we keep hammering you and why we keep asking the Pentagon to declassify as much as you can, so that at least maybe we can get it out in dribbles that this program has been good for the national defense of the United States of America.

Looking to the future, for my last question, I will ask of all of you to see what you can do to help us. I see that there is no money requested for fiscal year 1989, but I will just bet that there will be some B-1 R&D money when the fiscal year 1990-1991 budget comes over here a year from now.

Tell me, please, what more you think you will know and therefore what more we will know in all likelihood about defense avionics for the B-1B by the time we come to this markup problem a year from now, where we are going to be a lot quicker than most of us realize right now?

Do a little star-gazing into the future. Tell me how much more you think we are going to know a year from now as to where we are going, assuming the money you have requested is authorized.

General HALL. I would add, Mr. Chairman, that we will still be 6 months shy of completing the Mod 2, Block 5. But I think we will have a pretty good handle at that point on how well we are meeting the baseline capability for SAC.

And I would think at that point also we would know, based on updates to the threats, what we are going to have to have to retain that viable penetrating capability into the mid-nineties. And that is the time we are going to have to start looking at the enhancements to provide the survivability that is required to meet SAC's mission.

So I think we will have more data and a better understanding of the baseline capabilities and a better foundation on which to start looking at enhancements to the system.

Senator EXON. Dr. Woodruff.

Dr. WOODRUFF. I agree. I think a year from now hopefully we will know so much more about the way the system is going to work, and I think we will be able to say it is a success and we will know what we have to do to finish it. And I am really counting on that.

Senator EXON. Would you care to add anything, Mr. Krings?

Mr. KRINGS. There will be some very major accomplishments by that point in time. Most of the operational testing other than electronic countermeasures will be done, and that electronic countermeasures "shortfall" should not be put in an improper perspective.

It is not the catch-all of the whole airplane. A significant portion of the airplane's capabilities will be demonstrated operationally by then. And the fundamental capabilities of the electronic countermeasures system will have been flight tested and not just laboratory tested.

So I agree, we will be very far down the line, and for all practical purposes we will have totally demonstrated operationally what the capability of the airplane is, except the ECM, which is really a small part of it.

Senator EXON. Gentlemen, thank you very much. It has been a very interesting and comprehensive hearing. There may be a few additional questions by members of the committee that we did not cover this morning. If so, we will get those to you as quickly as we can.

We would appreciate your making a response in a timely fashion for the record because, as I have emphasized over and over again, we just have to have more information. You have given us some helpful information today for that difficult conference and others that will be coming up with the House of Representatives.

Thank you for being here. You were helpful.

And with that, we are adjourned.

[Whereupon, at 10:45 a.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1989

MONDAY, APRIL 18, 1988

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC FORCES
AND NUCLEAR DETERRENCE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

PACE AND DIRECTION OF THE STRATEGIC DEFENSE INITIATIVE, AND COMPLIANCE WITH THE ABM TREATY

The subcommittee met in open session, pursuant to notice, at 2:08 p.m., in room SD-138, Dirksen Senate Office Building, Senator J. James Exon (chairman) presiding.

Present: Senators Exon, Nunn, Levin, Glenn, Thurmond, Cohen, Quayle, and Symms.

Staff present: Arnold L. Punaro, staff director; Andrew S. Effron, counsel; Robert G. Bell, Robert F. Bott, Brian D. Dailey, Colleen M. Getz, Sherri Wasserman Goodman, and William E. Hoehn, Jr., professional staff members; Mickie Jan Wise, staff assistant.

Also present: Jeffrey B. Subko, assistant to Senator Exon; Gordon Kerr and Gregory J. Weaver, assistants to Senator Levin; William J. Lynn, assistant to Senator Kennedy; Milton D. Beach and Donald A. Mitchell, assistants to Senator Glenn; Leon Fuerth, assistant to Senator Gore; Terrence M. Lynch, assistant to Senator Shelby; Henry D. Sokolski, assistant to Senator Quayle; Mark J. Albrecht, assistant to Senator Wilson; and Rita Scott, assistant to Senator Symms.

OPENING STATEMENT OF SENATOR J. JAMES EXON, CHAIRMAN

Senator EXON. The subcommittee will please come to order.

The Subcommittee on Strategic Forces and Nuclear Deterrence meets today for its 14th and final time prior to markup of the amended fiscal year 1989 budget request. Our subject today, once again, is the Strategic Defense Initiative. Today's hearing represents our third this year on SDI issues. On March 1, the subcommittee received testimony from Gen. Robert Herres, the Vice Chairman of the Joint Chiefs of Staff on the Joint Chief's Requirements for an SDI Phase I, and how those requirements were developed. We also were briefed by Lt. Gen. James Abrahamson, the SDIO Director on the Phase I SDI programs.

Then, on March 22, the subcommittee received testimony from outside witnesses on accidental launch protection system proposals.

Today's hearing will focus on the overall fiscal year 1989 budget request for the Strategic Defense Initiative and the extent to which those funds, if approved, will be used for purposes in full compliance with existing U.S. treaty obligations.

I would remind our colleagues that last year's hearing on this same subject proved to be instrumental in achieving one of the compromise legislative provisions during our conference with the House. I expect this year's hearing to be no less important. We are thus looking ahead to that final conference with the House once again.

Thus, it is with great pleasure that I welcome two witnesses here today. Our first witness is Dr. Robert Costello, the Under Secretary of Defense for Acquisition, and the cognizant DOD official for ensuring the compliance of all DOD activities with existing U.S. treaty obligations.

Dr. Costello, we look forward to your authoritative testimony regarding the issues of the SDI funds requested for fiscal year 1989 and their compliance with treaty obligations.

This testimony is particularly important since the SDI annual report has much more ambiguous language than did last year's, which will make it difficult for us to repeat last year's formula in conference with the House.

Following Dr. Costello's testimony, we will hear from General Abrahamson, who will discuss the fiscal year 1989 SDI funding request.

Welcome again to you, General. We look forward to your testimony as well.

Before we proceed further, let me remind my colleagues of two points. First, I would like to move quickly to Dr. Costello's verbal presentation and allow each member 5 minutes for questions focused on compliance issues. Then we will hear from General Abrahamson, and after his testimony, we will have further questions for both witnesses.

Second, I would then remind members that in the event important questions cannot be answered fully in this open session, we have preserved the option to move at the end of this open session to our Armed Services Committee hearing room in SR–222 to hold a brief closed session if that becomes necessary.

I hope that that will not be necessary and that we can move things along.

I would tell the members of the committee and also our witnesses that with the developments in the Persian Gulf today, there was a briefing scheduled for the Members of the Senate at 5. That has now been moved up to 3:30, and we have an Armed Services meeting at 5.

So I would hope that as important as this matter is today, that we could be as brief as possible.

With that, the Chairman will be brief by not saying anything further other than to say that Senator Thurmond will be here with an opening statement that I think he will enter for the record.

With that, Dr. Costello, we are happy to recognize you.

Senator **Symms**. Excuse me, Mr. Chairman.

Senator **Exon**. Senator Symms.

Senator SYMMS. I am not a member of this subcommittee, but I want to welcome the two witnesses and to just briefly say that I have three or four questions that I am going to leave here for the record because, as you know, we have a Republican meeting that has been called at this hour, and they are putting the heat on us to show up over there. So there are a lot of conflicts.

Senator EXON. I understand, and we will be glad to have your questions entered into the record at an appropriate time for reply, Senator, and we appreciate your being here.

Senator SYMMS. Thank you.

I am a strong supporter of SDI, Mr. Chairman, as you know, and I am very concerned about these cutbacks that have taken place, and I am interested to have some of the questions directed to General Abrahamson about what he thinks might happen with contracts that have been let, that we break them and so forth, and where we end up with credibility and lawsuits and how it is going to affect the program.

Senator EXON. We intend to try and get into some of that today, and if you could be here as long as you could, we would sure appreciate it.

Senator SYMMS. Thank you.

Senator EXON. Dr. Costello.

STATEMENT OF DR. ROBERT B. COSTELLO, UNDER SECRETARY OF DEFENSE FOR ACQUISITION, AND DOD COGNIZANT OFFICIAL FOR COMPLIANCE OF DOD RDT&E ACTIVITIES WITH U.S. LEGAL OBLIGATIONS

Dr. COSTELLO. Thank you very much, Mr. Chairman. It is a pleasure for me to testify before your subcommittee on Defense Department compliance with existing U.S. treaty obligations, and I do request permission to insert my prepared written statement.

Senator EXON. Without objection, so ordered.

Dr. COSTELLO. The subject is very important to me and to Lieutenant General Abrahamson, who has accompanied me today. I would also like to introduce one of the other key people in the Defense Department, an expert deeply involved in this subject, who is also accompanying me, and that is Mr. Lee Minichiello. He is the Assistant Deputy Under Secretary of Defense for START, Arms Control and Compliance from our office.

Because of the subcommittee's interest in the Strategic Defense Initiative Program vis-a-vis treaty compliance, my testimony will address how we are managing the SDI program within treaty obligations.

Let me begin by pointing to the Antiballistic Missile Treaty. The executive branch examined the treaty in October 1985 and found that ABM systems based on other physical principles, the so-called OPP ABM systems, may be developed and tested in any basing mode but may not be deployed under the treaty.

I recognize that some in Congress do not share totally that view. However, I do not want to prompt additional debate on the subject. Rather, I would like to focus on the SDI program itself. As the President has reaffirmed many times, SDI will be carried out consistent with the ABM Treaty.

As a matter of fact, the SDI program we are proposing includes no experiments or tests in fiscal year 1989 that would go beyond what some call the restrictive interpretation of the ABM Treaty, nor does our program include any funds to purchase equipment in fiscal year 1989 that would be uniquely required for such experiments or tests.

Because of congressional interest in the subject, if our national program needs changed, we would certainly notify the Congress before proceeding.

As the Department's official responsible for treaty compliance, I am pleased to report that we have established a thorough, efficient process to set procedures and reviews.

My office, under Mr. Minichiello's direction, works within the framework of a centralized body we call the Compliance Review Group. Besides my office, other representatives on that group include the Office of the Joint Chiefs of Staff, the Office of the Under Secretary of Defense for Policy, and the Office of the General Counsel. This group works in conjunction with the SDI offices, the services, and the Defense agencies, to direct and review technical analyses for compliance.

This process helps structure the research and development, field testing and acquisition programs so they are compliant. In a nutshell, the end result is to certify programs for compliance on a case-by-case basis.

All SDI programs now receive more scrutiny than other programs and are given a critical evaluation by the Defense Acquisition Board, of which I am Chairman. As you know, last fall the Defense Acquisition Board reviewed, and the Office of the Under Secretary of Defense for Acquisition recommended to the Secretary of Defense that six SDI elements be approved to enter the demonstration and validation phase. This recommendation was subsequently approved by the Secretary of Defense.

This summer, the Defense Acquisition Board will conduct the first annual scheduled review of the SDI program.

Mr. Chairman, that concludes my brief remarks. Thank you again for the opportunity to be here. I will be pleased to respond to questions.

[The prepared statement of Dr. Costello follows:]

PREPARED STATEMENT BY DR. ROBERT B. COSTELLO, UNDER SECRETARY OF DEFENSE FOR ACQUISITION

Mr. Chairman, thank you for the opportunity to testify before the Subcommittee on Strategic Forces and Nuclear Deterrence. Today, I will discuss my responsibilities to ensure that all DOD activities are fully compliant with our treaty obligations. Accompanying me today is Lt. Gen. James A. Abrahamson, Director of the Strategic Defense Initiative Organization.

In general, we have developed what I believe to be an excellent process to ensure continuing compliance not only with the ABM treaty, but with other treaty obligations. As part of this process, in coordination with the general counsel, the Under Secretary of Defense (Policy), the Joint Chiefs of Staff, the defense agencies, the SDIO, and the military services, my office issues instructions and guidance to the military services and defense agencies to help structure their R&D, field-testing, and acquisition programs so they are compliant. We establish the necessary management process and procedures for evaluating compliance; and render decisions, on a case-by-case basis, which certify our programs as compliant with our treaty obligations. We also review quarterly compliance reports to certify internal compliance by each military service secretary and defense agency directors, and submit timely compliance reports to the Secretary of Defense.

Questions which arise within the department regarding specific agreements are referred to me for resolution on a case-by-case basis. Any system that raises a compliance issue will not be tested, prototyped or deployed without my prior clearance. Before rendering a decision, I receive the advice of our general counsel, the Under Secretary of Defense (Policy), and the Chairman of the Joint Chiefs of Staff. Let me reassure you that I will never do two things: shirk my responsibilities to insure the security of the United States or shirk my responsibilities to insure that the DOD is compliant with its ABM Treaty obligations.

To assist me in evaluating research & development, testing, acquisition, and deployment programs, a DOD compliance review group chaired by Mr. Lee Minichiello, the Assistant Deputy Under Secretary of Defense for Strategy, Arms Control & Compliance, who has accompanied me here today, provides analysis on the compliance of any experiment or program. The Compliance Review Group is composed of a general counsel representative, as well as representatives from International Security Policy and the Joint Chiefs of Staff. It functions as the centralized body within the Department of Defense responsible for directing and reviewing technical analysis to insure compliance with our obligations. I want to reemphasize technical analysis.

For example, the first step in evaluating a strategic defense initiative experiment occurs when the SDIO contemplates an experiment which may require technical review. Once identified, the program manager briefs the Compliance Review Group on the purposes and objectives of the experiment; how the experiment is structured; and on important programmatic timeframes and deadlines.

Members of the Compliance Review Group then discuss with the program manager the relevant compliance aspects of the prospective experiment; any pertinent guidance and instructions dealing with the experiment; any previous Compliance Review Group analysis that could have a bearing on the experiment being reviewed; and, if appropriate, clarifications regarding ABM Treaty language.

At this juncture, the Compliance Review Group constructs a framework for any technical analysis necessary to help clarify and ultimately resolve compliance questions, should any arise. The Compliance Review Group may require further analysis before assessing compliance; or it may direct an independent technical analysis of the experiment by a DOD contractor.

After completing its assessment, and having been appropriately coordinated, I make a determination which becomes guidance for the SDI program. We use it as the basis for judging ABM Treaty compliance, as well as providing guidance to the program manager.

Now I would like to turn to a controversial subject—interpretation of the ABM Treaty. The executive branch examined the treaty in October of 1985 and found that ABM systems based on other physical principles—the so-called OPP ABM systems—may be developed and tested in any basing mode but may not be deployed under the treaty. I recognize that some in Congress do not share this view. However, I do not want to prompt additional debate on this subject; rather, I would like to focus discussion on the SDI program. As the President has reaffirmed many times, SDI will be carried out consistent with the ABM Treaty.

As a matter of fact, the SDI program we are proposing includes no experiments or tests in fiscal year 1989 that would go beyond what some call the restrictive interpretation of the ABM Treaty; nor does our program include funds to purchase equipment in fiscal year 1989 that would be uniquely required for such experiments or tests. Because of Congress' interest in this particular subject, if our program needs change, we would certainly notify Congress before proceeding.

In my role as chairman of the Defense Acquisition Board, I have subjected SDI programs to critical and extensive evaluations. In fact, SDI programs now receive even greater scrutiny that most other major system acquisitions. The Defense Acquisition Board conducted their initial review of the program last fall. As a result of that review, the DAB recommended to the Secretary that a multi-phased approach was appropriate for development of the total strategic defense system (SDS) and that six SDI elements move into the demonstration/validation phase. These six elements include the: boost surveillance and tracking system (BSTS); the space surveillance and tracking system (SSTS); the ground surveillance and tracking system (GSTS); the battle management/command, control and communications system (BM/C^3); the space-based interceptor (SBI); and the exoatmospheric reentry vehicle intercept system (ERIS). I want to emphasize that the purpose of the demonstration/validation phase is to resolve technical uncertainties in the system concept and validate its feasibility. This must be accomplished before SDI enters into full-scale development, which will be some years in the future.

The Defense Acquisition Board also decided to conduct annual reviews of the SDI program because of its cost, complexity, and size. We intend to bring to bear all of the resources of the acquisition process in the development of SDI. We are also requiring updated analyses and assessments by the Defense Intelligence Agency, the Joint Chiefs of Staff, and the DOD cost analysis improvement group.

This summer, we will conduct the first annual review of the Strategic Defense Initiative program. It is important that everyone realize, however, that we do not plan to make the next milestone decision (milestone two, or full-scale development) until SDI is ready—which is expeced to occur in the early- to mid-1990s.

As a result of the entire process I have described, Secretary Carlucci and I can confidently state that the SDIO's research program is being conducted in a manner fully consistent with our ABM Treaty obligations; and is consistent with President Reagan's directive to insure that the SDIO's programs remain fully compliant with all our treaty obligations.

This concludes my statement. I would be pleased to respond to your questions.

Senator EXON. Thank you.

We stated earlier that we will have a 5-minute round of questioning following Dr. Costello's testimony, and then we will go to General Abrahamson and return as time will allow.

I would like to recognize Senator Thurmond for any opening statement that he has or wishes to insert in the record at this time, and then we will begin our round of questioning.

Senator THURMOND. Thank you, Mr. Chairman.

I want to join you, Mr. Chairman, in welcoming our witnesses to the subcommittee this afternoon for what we all hope will be the last hearing before we begin our markup process.

General Abrahamson is here in a familiar role to describe the SDI program as he has done so well over the past few years.

I want to thank you, General, for the great job you have been doing.

Dr. Costello is before us today in his new role as the Department of Defense official charged with assuring that acquisition programs are conducted consistent with our arms control commitments.

A number of questions arose in our closed hearing on the SDI program having to do with the JCS requirements for the Phase I system and the goals of the Phase I system. I am glad to see that General Abrahamson addresses these issues in his testimony and that he has included in his testimony the excellent article by Secretary of Defense Carlucci that puts the Phase I effort in the proper context of a necessary first step.

Following the last SDI hearing, I received a letter from Chief of Staff of the Air Force, Gen. Larry Welch in which he provides a very well stated perspective on issues that arose in the previous SDI hearing.

I ask unanimous consent, Mr. Chairman, that General Welch's letter be made a part of the record at the conclusion of my statement.

Senator EXON. Without objection, so ordered.

[The information referred to follows:]

PREPARED STATEMENT OF SENATOR STROM THURMOND

Thank you, Mr. Chairman. I join you in welcoming our witnesses to the subcommittee this afternoon for what we all hope will be the last hearing before we begin our markup process. General Abrahamson is here in a familiar role to describe the SDI program, as he has done so well over the past few years. I want to thank you, General, for the great job you have been doing. Dr. Costello is before us today in his new role as the Department of Defense official charged with assuring that acquisition programs are conducted consistent with our arms control commitments.

A number of questions arose in our closed hearing on the SDI program having to do with the JCS requirements for the Phase I system and the goals of the Phase I system. I am glad to see that General Abrahamson addresses these issues in his testimony, and that he has included in his testimony, the excellent article by Secretary of Defense Carlucci that puts the Phase I effort in the proper context of a necessary first step. Following the last SDI hearing, I received a letter from Chief of Staff of the Air Force General Larry Welch in which he provides a very well stated perspective on issues that arose in the previous SDI hearing. I ask unanimous consent that General Welch's letter be made a part of the record.

Mr. Chairman, it is probably inevitable that the SDI program request will be reduced by the Congress, even though the Department of Defense has already reduced the fiscal year 1989 request by over $1.6 billion. I will not support further reductions, and I believe that today's testimony can make it clear that the SDI program is not a level of effort activity that can absorb further reductions without effect. There are detailed program plans and testing milestones associated with the six SDI technologies that were approved for the demonstration and validation phase of the defense acquisition process. If we reduce the SDI request still further, these schedules will slip, with a corresponding slip in the date by which informed decisions can be made about whether to proceed with SDI development and deployment.

Before we proceed, Mr. Chairman, I want to congratulate you for the superb leadership and dedication you have again shown in preparing the subcommittee for making recommendations for the fiscal year 1989 Defense Authorization. I look forward to working with you as we conclude the process in the coming weeks and months.

Thank you, Mr. Chairman.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE AIR FORCE
OFFICE OF THE CHIEF OF STAFF
UNITED STATES AIR FORCE
WASHINGTON, D.C. 20330

24 March 1988

Honorable Strom Thurmond
United States Senate
Washington, DC 20510-0001

Dear Senator Thurmond

I have reviewed the testimony and discussions during the 1 March hearing with the Subcommittee on Strategic Forces and Nuclear Deterrence and subsequently reflected on the discussion of a "bolt out of the blue" strategic nuclear attack on the U.S. at the 16 March Senate Armed Services Committee hearing. The following comments clarify issues raised during that discussion.

There seems to be no disagreement over what provides deterrence of a surprise attack or a generated attack. Successful deterrence comes from U.S. retaliatory capability that ensures the Soviets clearly perceive that the cost to them more than offsets the pressures to launch an attack. The pressures to attack are lower in the surprise attack scenario than in the crisis scenario. Hence, while deterring a surprise attack is the first imperative, that does not make it the most demanding task for strategic nuclear forces. Stability in crisis requires all the forces needed to deter a surprise attack plus additional forces that can raise the cost to the Soviets as pressures mount for a strategic nuclear attack and rational behavior becomes less clearly definable.

On the issue of the need to deal with the threat of a surprise attack, the Air Force does not believe, as suggested in the 1 March questioning, that we can"... forget about that 'bolt out of the blue business'...". The Air Force has consistently insisted we must have the forces to deter a surprise attack and to provide stability in crisis. My verbal comments at the outset of the 16 March hearing reemphasized that conviction.

The very substantial improvements in day-to-day alert forces over the past 10 years, resulting from programs approved by the Congress and further improvements coming over the next few years, provide high confidence deterrence of a surprise attack. The national concentration on filling that need is a result of the concerns regarding the strategic deterrent that surfaced during the seventies. We need not apologize for having succeeded.

The confusion in discussing "bolt out of the blue" comes from inconsistent use of the term. The Air Force considers the definition of a surprise strategic nuclear attack (the so-called "bolt out of the blue") to be an attack in the absence of a U.S. - Soviet confrontation, conflict or other world situation that could lead to any reasonable expectation that the Soviets might resort to a strategic nuclear attack. Others talk about a "bolt out of the blue" attack after a build-up during a crisis.

In the 1 March hearing, General Herres described the scenario the Joint Chiefs agreed to in evaluating a possible Phase I SDI deployment. His statement for the record says: "First, the initial system must limit the damage that can be expected from the leading edge or early phases of wave one of a major Soviet nuclear attack." In the course of his testimony, he carefully described the expected benefits of disrupting the leading edge of a much larger attack. I agree with that characterization of the scenario and the description of the expected, or at least hoped for, benefits.

The only apparent conflict in the testimony during the two hearings comes from the inconsistent use of the term "bolt out of the blue". In General Herres' 1 March testimony he said; "... perhaps we have used the 'bolt out of the blue' term a little bit too loosely ... -- let's say a very rapidly developing or escalating crisis, 24 or 48 hours, that kind of thing." An attack following an escalating crisis is not, in my opinion, a surprise attack.

Questions and comments about Rail Garrison during both hearings also tended to divide the scenarios into surprise attack and conditions warranting generating the full strategic nuclear force. That simplification serves neither clarity nor understanding. Transitioning Rail Garrison to Rail Mobile does not increase offensive potential since the missiles are already on alert while in garrison. Therefore, transitioning to Rail Mobile is less threatening than actions to generate higher bomber or SLBM alert which increase offensive potential. The decision to disperse in a Rail Mobile mode could be a response to Soviet technical developments, a response to changes in the force balance or force deployments, changes in the world situation or any number of situations short of conditions justifying full generation of strategic nuclear forces.

The SICBM, if the nation finds it to be affordable, would make an important contribution to stability in crisis by adding more to the offensive element of the strategic nuclear deterrent force. That is the proper justification for that system. We should evaluate the potential contribution of a Phase I SDI deployment on the deterrent value of an ability to disrupt the leading edge of a larger attack. That capability adds an almost totally missing defensive element to overall deterrence. We cannot justify the cost of either system on the basis of deterrence of a surprise attack alone. Both would serve deterrence on a much broader scale.

Sincerely

Larry D Welch

LARRY D. WELCH, General, USAF
Chief of Staff

Senator THURMOND. Mr. Chairman, it is probably inevitable that the SDI program request will be reduced by the Congress even though the Department of Defense has already reduced the fiscal year 1989 request by over $1.6 billion.

I will not support further reductions, and I believe that today's testimony can make it clear that the SDI program is not a level of effort activity that can absorb further reductions without effect. There are detailed program plans and testing milestones associated with the six SDI technologies that were approved for the demonstration and validation phase of the Defense acquisition process. If we reduce the SDI request still further, these schedules will slip with a corresponding slip in the date by which informed decisions can be made about whether to proceed with SDI development and deployment.

Mr. Chairman, before we proceed, I want to congratulate you for the superb leadership and dedication you have again shown in preparing the subcommittee for making recommendations for the fiscal year 1989 Defense authorization.

I look forward to working with you as we conclude the process in the coming weeks and months.

Thank you, Mr. Chairman.

Senator EXON. Thank you, Senator Thurmond.

Senator Nunn, do you have any opening statement?

Senator NUNN. No opening statement, Mr. Chairman. I will have some questions.

Thank you for having this very important hearing.

Senator EXON. Thank you.

Dr. Costello, let's go right to the questions now and see if we can move things along because there will be many questions today that we would like your clarification on.

SDI MANAGEMENT AUTHORITY

A memorandum on SDI management authority dated 16 November 1987, signed by Secretary Weinberger, contained the following closing paragraph, and I quote, "Further, Congress may choose specifications which would tend to fragment the intent of centralized control of SDI research. Should congressional authorization or appropriations move vital research from SDI funding lines to service or DOD agency program elements, the Director, SDIO, will have specific Format I and be authorized to ensure that SDI research objectives and priorities are maintained."

So Dr. Costello, the way that I would read that statement and the way our lawyers have interpreted that is that it says I do not care what the congressional busybodies tell us about the specific program, if it was in the SDI and the Congress tells us to transfer it, we are going to ignore the law and keep General Abrahamson in charge.

Dr. Costello, is this memorandum still in effect, or has it been rescinded or superseded, and if so, by what document or memorandum?

Now, I think this is—the question I am asking you is the basic thrust of major concerns that this subcommittee and the committee have. I will just see if I can expand on its a little bit and give you a chance to respond to a whole series of things.

Dr. Costello, should the Congress direct that a program for example, BSTS or ALS, be transferred to the Air Force SDI and managed by the Air Force, do you intend to uphold the law, or will you continue to allow SDIO director, to use Secretary Weinberger's words, "to ensure that SDI research objectives and priorities are maintained?"

Dr. COSTELLO. We will uphold the law. It is a reasonable statement, and that is the way we are operating.

I think the intent of that letter has been transcended by a series of events. It is extremely important that the integrity of the program, the focus that General Abrahamson and his unique staff have supplied to that program, be continued and encouraged to continue in their management.

Since that time also, we have had a more aggressive and interactive role with the various technical functional areas making up the Office of the Secretary of Defense; and certainly with further review by the Defense Science Board, as well as General Abrahamson's and my own joint discussions and reviews of the program.

Senator EXON. Do I take it then, that while there has been no formal change in policy, events and happenings have changed it, and whether our interpretation of Secretary Weinberger's comments were right or wrong, they are no longer a part of the theory and operating procedures of the Department of Defense?

Dr. COSTELLO. I think your interpretation is correct in saying that they are no longer directly applicable to SDI any more than they are to any other program. The Secretary has a responsibility to ensure that all programs, number one, follow the law; and number two, are professionally managed in an outstanding way.

I think that there was some conversation there about the use of Format I. That they would not be used anymore by the Office of the Secretary. As General Abrahamson can attest, we have used Format I, although we have passed all of those when he has met the goals we sought. We have an interactive program that is very effective today, under the normal operations in the Defense Department, which means that the program is subject to DAB reviews and management controls.

Senator EXON. I guess that I am not getting exactly the response that I would like to have. Let me try once more.

Dr. COSTELLO. Then I will try to answer more clearly.

Senator EXON. Are you saying that you think that some of us misinterpreted Secretary Weinberger's letter of November 16?

Dr. COSTELLO. No, I think you may have interpreted it right with the events at that time, but the intent has been surpassed or superseded by a series of activities by which we have been living.

On December 31 there was a Secretary of Defense memo stating the SDIO was subjected to the normal acquisition process, which is what I also said.

Senator EXON. Well, I want to ask you specifically again, has this memorandum that I have made reference to of 16 November 1987 been formally suspended or rescinded?

Dr. Costello. No. We think it informally has been by the sequence of events and by the memo of December 31, but that memo per se has not been specifically rescinded.

Senator Exon. So then are you saying that it does not need to be officially announced as passe or not longer in effect because events have outstripped its meaning, whatever that was, is that right?

Dr. Costello. That is the way we are approaching it, yes, sir.

Senator Exon. My time is up.

Senator Thurmond.

Senator Thurmond. Thank you very much.

TESTING ISSUE

Secretary Costello, in the course of your compliance review of the program, were you able to determine if technical merit, schedule and cost considerations are on the side of testing that is limited to the narrow interpretation, and did the Defense Acquisition Board review of the Phase I program consider the testing issue?

Dr. Costello. In the Defense Acquisiton Board, we look at all of the activities, fiscal restraints as well as treaty implications. So we look at all aspects of that and take that into consideration as we review the programs with the General.

ZENITH STAR AND BSTS EXPERIMENTS

Senator Thurmond. Secretary Costello, when do you plan to complete the assessments of the Zenith Star and BSTS experiments? Can you address in open session what aspects of these experiments remain under review?

Dr. Costello. The Zenith Star Program has basically been completed. It is in administrative review now with very little work left to be done. The General and I were discussing BSTS, and the General has looked at the estimated costs and the technical accomplishments. He is restructuring the program to some degree, and he might want to address that.

Senator Thurmond. Did you want to say something on that, General?

General Abrahamson. I would merely add a point on the BSTS, sir. What we have done is that the initial experiment that we called a Zero Sat, which was judged to be a fully compliant experiment, is being reduced rather than expanded. I can unequivocally guarantee that the way we would intend to conduct that experiment when we finally finished the definition of it is that it would be a compliant experiment.

We are now looking at the next satellite that comes in line. That particular satellite is not under final contract, and that is also being reviewed by the Compliance Committee. I cannot project the time that is involved for that particular review.

SDI TESTS

Senator Thurmond. Dr. Costello, are all of the planned SDI tests for fiscal year 1989 within the bounds of the President's directive, namely, that the United States as a matter of policy will adhere to a more restrictive interpretation of the ABM Treaty than is legally required by the ABM Treaty signed in 1972?

Dr. COSTELLO. We stated that in the testimony, and it is true within the constraints of the narrower interpretation.

Senator THURMOND. Thank you, Mr. Chairman.

Senator EXON. Thank you.

The Senator from Michigan, Senator Levin, has asked me to call upon Senator Nunn first because I understand Senator Nunn has some conflicts in his time.

Senator Nunn.

Senator NUNN. Thank you, Mr. Chairman, and I appreciate the Senator from Michigan yielding.

TESTING ISSUES

I just want to make it absolutely clear here that I think Senator Thurmond's questions probably have already gotten this on the record, but I think we are going to have to have it more clear.

Dr. Costello, last year's Defense Authorization Act which was signed into law by the President on December 4 contains a provision, section 225, prohibiting the obligation or expenditure of fiscal year 1988 or prior year funds for any development or testing, including any long lead aquisition of material or equipment for such development or testing, for any ABM system or component that is not consistent with the SDI development and testing activities described in the April 1987 SDIO report.

This year's SDIO report states "Currently, no experiment has been approved which would not fall within the categories used in appendix D to the fiscal year 1987 report to the Congress on SDI."

In your statement today, you say, again quoting, "The SDI program we are proposing includes no experiments or tests in fiscal year 1989 that would go beyond what some call the restrictive interpretation of the ABM Treaty, nor does our program include funds to purchase equipment in fiscal year 1989 that would be uniquely required for such experiment or test."

Is that an accurate quotation?

Dr. COSTELLO. That is an accurate quotation, sir.

Senator NUNN. Does this mean that based on the experiments which have been approved to date, there are no SDI development or testing activities planned in fiscal year 1989, including long lead acquisition of material or equipment for such development or testing, which would conflict with section 225 of last year's bill?

Dr. COSTELLO. I stressed that, I think, in my testimony. I said uniquely, unique materials, but yes, it does.

Senator NUNN. The answer is yes?

So if that provision referencing the 1987 report were a part of our law this year, it would—your plans and your activities planned for in the budget would comply with that.

Dr. COSTELLO. As currently stated.

Senator NUNN. Does that mean you reserve the right to change it?

Dr. COSTELLO. I do not think there is any need to change it, sir. We also indicated that if we thought we had to change it, we would notify you. But, as planned, there are no tests scheduled or unique materiel being purchased that would violate the intent as stated.

Senator NUNN. In his testimony to the committee on February 18, Secretary Carlucci said, quoting him, that "there were no tests in the 1989 budget" which could raise the treaty interpretation issue, but there were "two tests that may well take place in the 1990–1991 time frame" which were under review for treaty compliance but which "will probably not raise the treaty compliance question."

One of the two tests cited by the Secretary was a space-based interceptor, SBI, experiment scheduled for fiscal year 1990.

On March 15 you certified that the experiment will be in compliance with the ABM Treaty and would not involve the testing of a space-based ABM component.

Am I correct?

Dr. COSTELLO. Yes, sir.

Senator NUNN. Is that still your view?

Dr. COSTELLO. That is still our position.

Senator NUNN. General Abrahamson, is that your view?

General Abrahamson. Yes, sir.

BSTS PROGRAM TESTS

Senator NUNN. The other test cited by the Secretary was BSTS. As currently planned, does the BSTS experiment require any long lead acquisition of materiel or equipment in fiscal year 1989 for development or testing which would be inconsistent with the development or testing described in last year's SDIO report?

Dr. COSTELLO. It is my understanding, as I indicated earlier, the BSTS program is now under some restructuring because of fiscal restraints as well as other technical constraints.

Perhaps the General would be better prepared to anwser that.

Senator NUNN. General?

General Abrahamson. As I indicated, sir, the first space experiment has been reduced, and that is still in definition, and therefore, the reduced experiment must go before a compliance committee and for a final decision to Mr. Costello.

The way we would intend to reduce such an experiment, I can guarantee, unequivocally at this point that there will be no treaty kind of issues associated with that.

Then, the next space experiment, major space experiment, is the first satellite itself, which is presently scheduled for the 1993 or 1994 time frame.

I think the key point is that is in a compliance review. Our responsibility, given that that law was passed that way associated with this year, would be to ensure that whatever that experiment is, is tailored to be compliant, and what that underscores is that the compliance process is an iterative process. What we do our very best to do is to conceive an experiment that would clearly be technically adequate, that would provide some of the critical areas of information, and also would be compliant. Then we come back, that is reviewed, and in some cases there are concerns stated.

Then we have to go back, restructure the experiment itself to ensure it is compliant, and that takes some time. And the problem in this case with the BSTS satellite for the 1993–1994 time frame is that that process is not completed.

Senator NUNN. Mr. Chairman, my time has expired.

If I could ask one other follow-up question, I would appreciate it.

Senator EXON. Go ahead, Senator Nunn.

ZENITH STAR CHEMICAL LASER EXPERIMENT

Senator NUNN. According to General Abrahamson's opening statement, you are currently reviewing the Zenith Star chemical laser experiment for treaty compliance. The General's statement says "As a result of the compliance review conducted to date, it appears that such an experiment using the Alpha laser and the Lamp mirror and various optical sensors could be conducted in a compliant manner."

Does this mean that as currently planned, the Zenith Star experiment would not require any fiscal year 1989 funds for long lead acquisition of materiel or equipment for development or testing inconsistent with the development and testing described in last year's Defense Authorization Act?

Dr. COSTELLO. If the treaty compliance review, as we are conducting it now, progresses as we see it, there will be no problem. In fact, the review, as I indicated before, is almost complete at the present time. The technical review is complete. One other staff function is just finishing up its portion.

Senator NUNN. Dr. Costello, to sum it up, if we take the Secretary's testimony in February as updated by your testimony and that of General Abrahamson today, what the administration is telling the Congress is that there is no requirement or plan for any development or testing or for any long lead acquisition of materiel or equipment for such development or testing in fiscal year 1989 that would conflict with last year's statutory restriction on this matter, is that correct?

Dr. COSTELLO. That is correct, if you will please allow me to state "unique materiel." If we do not state "unique materiel," you could tell me I am buying aluminum, and I use aluminum in some space tests, so it is unique materiel.

Senator NUNN. We had that in the statute. So the question would anticipate that word "unique." That was part of the statute. We talked about that.

Dr. COSTELLO. We would concur with that.

General ABRAHAMSON. I think that is imperative.

Senator NUNN. General, then you do agree with the Secretary's answer?

General Abrahamson. Yes, sir. I would also underscore the need for the word "unique."

Senator NUNN. Right. Well, that is in the statute, as I recall it.

General ABRAHAMSON. Yes.

Senator NUNN. I understand your answer does include that.

Mr. Chairman, thank you for the additional time.

Senator EXON. Thank you, Senator Nunn.

Senator Cohen?

Senator COHEN. Thank you, Mr. Chairman.

Dr. Costello or General Abrahamson, what are the requirements established by the Joint Chiefs or the SDI Phase I as discussed in the annual report, Secretary Carlucci's annual report?

General **Abrahamson**. Yes, sir. We do have a summary of that particular requirement. It is classified Secret, and I would be happy to provide the actual statement that the JCS have made for the record.

[The information follows:]

The Joint Chiefs of Staff,
Washington, DC, June 23, 1987.

Memorandum for the Director, Strategic Defense Initiative Organization.
Subject: Joint Ballistic Missile Defense Operational Requirements for Phase I Ballistic Missile Defenses.

1. The United States continues to adhere to the concept of deterrence and, should deterrence fail, the concept of denying Soviet war aims as the means for preserving the security of the United States and its allies. [Deleted.]

2. The Joint Chiefs of Staff will provide * * * operational requirements for future BMD. [Deleted.] This memorandum sets out the operational requirements for Phase I of a multiphase BMD system. [Deleted.] Requirements for subsequent phases will be developed after future analyses of the evolving threat.

3. Phase I BMD will serve as a first step toward protecting the United States and its allies from ballistic missile attack. It will also be a significant complement to today's sole reliance on U.S. strategic nuclear retaliatory forces as a deterrent disincentive to a potential Soviet first strike. [Deleted.]

4. The operational requirements are based on the assumption that the primary mission of U.S. strategic BMD is to:

a. Enhance the future deterrent posture.
b. [Deleted.]

5. [Deleted.]

6. [Deleted.]

7. To meet the system goals, Phase I must possess certain system characteristics. [Deleted.]

8. [Deleted.]

9. The Joint Chiefs of Staff will continue analytic work to refine BMD operational requirements periodically throughout the SDI acquisition process, with particular emphasis on quantifying the time-dependent requirements for BMD.

For the Joint Chiefs of Staff:

William J. Crowe, Jr.,
Chairman, Joint Chiefs of Staff.

References:

*JCSM-66-87, 15 May 1987, "Justification for Major System New Start for the Strategic Defense Initiative Program for Ballistic Missile Defense Research".

**DOD Directive 5141.5, 21 February 1986, "Strategic Defense Initiative Organization".

***DIA Memorandum, S-1037/VP-TAO (SDIO), 23 April 1987, "Threat Development for Ballistic Missile Defense Operational Concepts and Requirements".

SPACE-BASED INTERCEPTOR

Senator **Cohen**. Looking at the open testimony, was a space-based interceptor part of that JCS established requirement?

General **Abrahamson**. Sir, the requirement dealt with the capability of a Phase I system. What we then outlined was the architecture that at the time we felt was the most responsive, would be the most effective in meeting that particular requirement.

Remember, this is early in a research program still. Therefore, I am sure that each year as we go through the program, that architectural baseline may change. That architectural baseline did include a space-based interceptor.

Senator **Cohen**. Specifically included it?

General **Abrahamson**. Yes, sir.

CAIG COST ESTIMATES

Senator COHEN. On page 12 of your statement, General, you indicate that DOD, I think at the CAIG, cost estimates, about $75 billion to $150 billion. That is quite a range, by the way, but is that just for Phase I, or is that all phases?

General ABRAHAMSON. Sir, that was a cost estimate for Phase I, and one more time I would underscore that the CAIG is a very disciplined process. It is a process that includes many tried and true algorithms, and many of these cost estimating algorithms do not contemplate some of the technologies that we are working for and working to be able to create.

Senator COHEN. Does that mean it will cost more or less?

General ABRAHAMSON. No, that is the reason for the very, very large range of estimates, because we are early in the program. And finally, as we approach at some point in the future a national decision about going ahead, it is certainly my intent, and I think the thrust of our program, if we are properly financed, to insure that it will be substantially less.

Each year that CAIG estimate will be updated and worked on, and that provides for me not so much an estimate of what it clearly will cost, but an estimate on where I have to work in order to ensure that those costs come down to something that will be affordable.

And, by the way, for the last several years I have been indicating the importance of affordability for precisely that reason, not some of the reasons that people have indicated. Certain press people have asked are you substituting affordability for the cost-effectiveness-at-the-margin criteria. That is not the case.

Dr. COSTELLO. When I first started working with General Abrahamson on this program, we were looking at manufacturing process technologies that would allow us to substantially increase the yield of certain semiconductors by a factor of 10 or maybe 20 or even higher. That would have a major impact on cost.

Senator COHEN. Well, are you both suggesting, then, that it is your intention to come in below the $75 billion?

General ABRAHAMSON. Well, I do not know if we can make it below $75 billion, but certainly our intent is to make it as low as possible and to keep searching for things that would be at the low end of that estimate. But credibility requires that we show you the full range.

Senator COHEN. So it is fair to say that the bottom line, at least, would be a minimum of $75 billion, and the question is how high, how much, how close to that $75 billion can you in fact hold it?

General ABRAHAMSON. Well, sir, I think it is pretty important to say that our cost estimates for the way we foresee Phase I today——

Senator COHEN. Let me say that CAIG has been fairly accurate in many other weapons systems.

General ABRAHAMSON. Yes, they have.

Senator COHEN. And perhaps the most accurate, I would say of all of the estimates that have been done.

General **Abrahamson**. I understand exactly what you are saying, and therefore, we do not want to lose the credibility of the CAIG process.

On the other hand, you must know the way that I am using this. For example, right now in our process of going through this exactly and carefully, I am finding that the space-based interceptor remains the high cost element, and so I am going back and fundamentally re-examining the architecture and the structure of that particular concept.

It is, I think, premature to indicate that we might not find some better ways of doing that job. Therefore, I will not buy $75 billion as a minimum, but it is my job to make it just as effective and as low cost as possible, and it is exactly like the other kinds of systems and cost estimates that have been made sometimes by critics at this incredible numbers of trillions of dollars. It is very premature to make those kinds of judgments.

Senator **Cohen**. My time is about to expire, but let me squeeze one last question in.

In Secretary Carlucci's annual report for fiscal year 1989, he talks about planned product improvement for the SDI Phase I concept in order to respond to Soviet countermeasures.

General **Abrahamson**. Yes, sir.

SPACE-BASED INTERCEPTORS

Senator **Cohen**. How soon after their deployment would space-based interceptors undergo a planned product improvement?

General **Abrahamson**. I think that is the definitive planning that we are too early in the program to be able to answer that. It is a reasonable question, Senator, but to be able to say that we know the answer to that right now, I just cannot predict.

But let me give you an example of how and why all of this is so important, and a concrete example.

Today our space-based interceptors, some of them would be using sensors that require great cooling because they only operate at very low temperatures. As the whole science of superconductivity is moving ahead we were investing very selectively in some of those areas. If, for example, that were to work out and we could put high temperature systems on that would reduce the cost and the complexity and the weight of many of those elements. So I cannot predict how fast that will occur.

SOVIET COUNTERMEASURES

Senator **Cohen**. But that has nothing to do with planned Soviet countermeasures to those systems, does it?

General **Abrahamson**. I am sorry, you used planned product improvements, and I was answering that question.

Senator **Cohen**. Well, in response to Soviet countermeasures, in other words, you have to calculate at this point looking at SDI, Phase I, what the likely countermeasures the Soviets would use. So you are directed by Secretary Carlucci to allow for planned product improvement.

General **Abrahamson**. Surely. Some of those can be very simple improvements, by the way. In many cases, for example, people worry about fast burn boosters, and they make specific calculations based on a particular orbital altitude, provided we have the room and the fuel to put maneuvering fuel there. One of the simple low cost, zero cost kind of responses is to just move a portion of the fleet down to lower altitude.

Senator COHEN. The question I really was asking was how soon do you plan to have these product improvements in response to anticipated Soviet countermeasures?

General ABRAHAMSON. I guess what I am trying to get across, sir——

Senator COHEN. You keep talking about costs. I want to know what your time frame is, what are you looking at in terms of time frames?

General ABRAHAMSON. What we are trying to do is, first of all, understand very carefully what the Soviets could do, and then secondly, try to assure that we have an array of technologies that we can use to meet them.

By the way, it would not make sense to implement all of those against some fictional Soviet threat until we begin to see that that Soviet threat might be employed. Therefore, the fundamental strategy that I have outlined in the program is a strategy of what I call branching and blocking. That means to bring forwards enough of the technology far enough so that we could respond quickly inside a Soviet time line.

In fact, it is my hope that by demonstrating some of those technologies early, they would choose not to use that countermeasure and that would save both of us a fair amount of investment.

Senator COHEN. Mr. Chairman, I want to thank you for your indulgence.

I just want to point out that you and I have sat in on hearings recently where the Soviets once again have been underestimated at almost every level, particularly dealing with armor and antiarmor. We found in testimony from the DOD that about 80 percent of all of our armor today is rendered obsolete by virtue of new Soviet improvements which startle us in terms of their capability.

So I am just trying to find out what we are anticipating in the SDI program.

Senator EXON. Thank you, Senator Cohen.

Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

Senator NUNN. Mr. Chairman, would the Senator yield for a few seconds?

Senator LEVIN. Yes.

Senator NUNN. I used the word "unique." You used the word "unique." I replied and said I thought it was in last year's statute. I remembered going around and around on that one for a day or so. We have other words in the statute, but the intent generally is along the line of unique, so the word is not in the statute, and yet that does fall within the general intent of the statute.

Dr. COSTELLO. As long as the intent is there. It is key to us.

Senator NUNN. Either way, if you leave that out, you have got a problem; if you put it in, you have got a problem. It requires good faith on the part of the people administering the program. So we went in your direction and relied on your good faith in that respect.

Dr. COSTELLO. Yes, sir, thank you.

Senator NUNN. And we will continue to use that word "unique."

Senator EXON. I recognize Senator Levin.

Again, I assume, General, that maybe some of the questions that you have been asked, I was at least hopeful that you might cover some of those in your opening statement.

Was that not your intent?

General ABRAHAMSON. Yes, sir, I have some of them. However, given your concern for time, I would like to offer my opening statement for the record and just underscore one element of it. However, if you wish me to comment on certain of those, I shall.

Senator EXON. Well, then, I guess it would be appropriate then for the other members of the committee, if they wish, to ask questions of you also since we have gone into that.

We do accept your statement for the record, but I will ask you for a recap of your statement after we finish this first 5-minute round of questioning.

Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

First, General, you used the word "compliant" a couple of times in answer to Senator Nunn's question, and you were making reference to, I believe, the 1993-1994 satellite and indicated that you were looking at it now to determine whether or not that would be compliant.

I understood you to mean in that context compliant with the narrow interpretation of the treaty.

General ABRAHAMSON. Yes, sir.

ZENITH STAR PROGRAM

Senator LEVIN. You made reference also, General, I think both of you have, to a current review of the Zenith Star experiment? I think you both have made reference to that.

Is there unique long-lead acquisition funding in the 1989 budget request for Zenith Star?

General ABRAHAMSON. For Zenith Star, sir, we have on contract for that integrated program. What we have is a study which meets absolutely the requirements that were laid out in the 1987 Authorization Act which says you must plan for, you are allowed to do that, and by the way, that is very important because we must be able to expend the funds to carefully examine both what we need technically in some of these programs, and then the funds to ensure that we can come as close as possible technically without exceeding the narrow interpretation of the treaty in each of those issues.

Senator LEVIN. My question was—I don't have any problem with that, but my question is, before you even get to the question as to whether, to a compliance decision, if there is no funding in there requested for long lead items for Zenith Star, it doesn't even reach the threshold issue——

General ABRAHAMSON. In 1989.

Senator **Levin**. Yes, is there funding in 1989, do you know, for unique, long lead items for Zenith Star?

General **Abrahamson**. In 1989, yes, we have a planned portion of the program where we would like to go beyond this presently limited system. The way we have described that for the contractors is that it would be an integrated, ground experiment, and as a ground experiment, just as anything in the laboratory, it could be conducted that way.

If indeed it became compliant, and it became compliant early enough so that we can indeed proceed beyond that, then we may be able to, depending on funding, to proceed further and plan for and invest in some of the elements for the space experiment.

I think the key——

Senator **Levin**. And when you use the word "compliant" there again——

General **Abrahamson**. Once again, I mean the narrow interpretation of the treaty sir.

Senator **Levin**. Okay.

So when will that decision, that compliance decision on Zenith Star, be completed?

Dr. **Costello**. The General and I gave the compliance group explicit instructions to make it their number one priority to get both of them done.

Senator **Levin**. Would that be a matter of months or weeks?

Dr. **Costello**. Months at the most.

Senator **Levin**. Months at the most, and you both expect that given the current status of that review, that that will be determined to be compliant, is that fair?

General **Abrahamson**. The Zenith Star experiment, yes, sir.

Senator **Levin**. Last year the administration testified that it had not arrived at an official definition of the term "based on other physical principles," in agreed statement D of the ABM Treaty.

I am wondering whether or not there is such a definition that has been arrived at yet?

And I am not here seeking the definition. I just want to know whether the definition has been arrived at yet.

Dr. **Costello**. It is still a complex issue. An individual outside of the Defense Department has been asked to define the term.

Senator **Levin**. So that is not completed yet?

Dr. **Costello**. It is not completed.

Senator **Levin**. Do we have any idea when that will be completed?

Dr. **Costello**. I have asked the same question.

Senator **Levin**. Who is that individual?

Dr. **Costello**. It is the State Department's responsibility.

Senator **Levin**. It is somebody outside of the State Department did you say?

Dr. **Costello**. I think it is in the State Department.

General **Abrahamson**. I believe, sir, that it is Judge Sofaer who has the legal position within the State Department to make such a response.

Senator **Levin**. So as far as you know, the definition of that is still being considered in Judge Sofaer's shop?

Dr. **Costello**. Yes, sir.

General ABRAHAMSON. I believe so, sir.

Senator LEVIN. In the April 1987 SDIO report, there was the following statement made: "Since the President has decided as a matter of policy to observe the more restrictive interpretation of the ABM Treaty, all statements in this appendix regarding compliance with the treaty provisions should be understood to be based on the more restrictive interpretation."

Has the President changed that policy in the last year?

Dr. COSTELLO. No.

General ABRAHAMSON. No, sir.

Senator LEVIN. Is there any reason why that statement did not appear in your 1988 report since the policy remains?

Dr. COSTELLO. I think any time a person gets a chance to write a report and can leave something out, they often do. I think it was a matter of personal concern rather than a policy concern, editorial license, perhaps.

Senator LEVIN. So it does not reflect any shift in policy?

Dr. COSTELLO. No, no shift in the policy.

Senator LEVIN. Just a tactic rather than a strategy? How would you phrase it?

Dr. COSTELLO. It might be well phrased that way, sir.

Senator LEVIN. Thank you, Mr. Chairman. I think my time is up, although I have not gotten the note, I think I am over.

Is there a 5-minute rule, Mr. Chairman?

Senator EXON. A 5-minute rule.

Senator LEVIN. I think I must be way over, but thank you, Mr. Chairman.

Senator EXON. Thank you.

Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman.

SDI PHASE I COSTS

Just a year ago, in March of 1987, I believe the estimate for the first phase of an SDI system was on the order of between $40 billion to $60 billion.

Now, as I understand it, the estimates for the first phase deployment are $75 billion to $150 billion, which is not only a tremendous increase, but a large delta between the high and low possibilities.

Are we currently considering further adjustments of this estimate, or is that solid? Why do we have such a big difference between the high and the low, and why such a big increase in one year? We have far more than doubled in one year.

General ABRAHAMSON. Sir, the $40 billion to $60 billion estimate was something that was made quite quickly based on an architectural study, and it had not gone through the full disciplined cost review of the CAIG process. That was done in the spring when that estimate was made, and frankly, it was why I am always so concerned about making estimates prior to the time that some of those are developed.

The $75 billion to $150 billion estimate is one that really resulted from the disciplined CAIG process. As I indicated earlier, there is a substantial difference between the lower end and the upper end, and this reflects the uncertainty involved both with new technology and changing requirements, and those requirements obviously do change.

It is certainly my intent to ensure that that is as low as possible but meeting the Phase I requirement that the Chiefs have laid out.

An example of precisely that process and how we do that is the SSTS and the GSTS. Now, those are both sensor systems, one based in the ground and one based in space, to allow us to be able to tell the difference between decoys and warheads, and you are fully aware of that.

For nearly 8 months after the DAB, we went through an extensive requirements study as well as a technology study on where we are, and as a result of that effort and supported by some of our space experiments, we have been able to reduce the requirements on both the satellite and the probe very substantially. That will reduce the costs on that system when the next system comes out.

That is an example of the process and how and why we hope that we can make it much more affordable.

CAIG COST ESTIMATING PROCESS

Senator GLENN. Well, I guess I am questioning the validity of the CAIG process itself. If it cannot come up closer than a 2 to 1 estimate of $75 billion to $150 billion, it seems to me some more scrubbing of that process is going to be in order so we have some figures we can better rely on.

General ABRAHAMSON. Sir, I agree with that, only I guess I would like to put it in this context. The cost methodology that the CAIG uses is based on an existing level of technology, and in fact, in many cases those are cost algorithms that are derived from the history of present electronic systems or present mechanical processes.

That is, of course, the essence of what SDI is really about, finding new ways to do those.

Now, when we have a technology system that we believe will allow us to substantially reduce those costs, then I have a second responsibility, and that responsibility is to the CAIG and to the cost community in the Department of Defense, and that is to show that that new process is credible enough that they can adapt those new algorithms, and they will indeed represent the reality of what a system made that way might cost in production.

So there is really a great amount of cost research which goes hand in hand with the hardware and software research in the program, and I think that is what that spread represents.

Senator GLENN. You mentioned new ways to do things. That alludes to the research that we are doing, of course, and in your testimony on page 6 you state that, and I quote, "Research continues to be balanced between mature and advanced technologies. We have not sacrificed technology efforts for directed energy concepts while promoting Phase I elements."

We have had some concerns about this, obviously, from previous conversations. I still have those concerns.

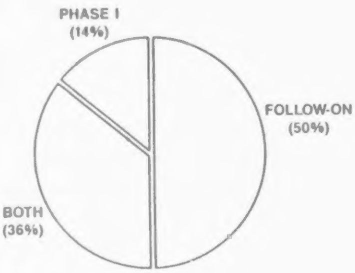
Obviously, of the $4½ billion request for DOD's fiscal year 1989 SDI efforts, how much is going to research and technology as opposed to Phase I deployment? Can you break that down so we have a figure, a rough figure, out of the $4½ billion, how much is still going to straight research on technologies that will be needed before we can really deploy a whole SDI system?

General ABRAHAMSON. Sir, first of all, it is rather hard to make that kind of a breakdown, but this slide is our best attempt to do exactly that.

FY89 RESOURCE ALLOCATION ($M)

PROJECTS	PHASE I	BOTH	FOLLOW-ON PHASES
SATKA			
BOOST SURVEILLANCE AND TRACKING SYSTEM		179	
MIDCOURSE SENSOR		90	84
GROUND-BASED RADAR			73
SENSOR TECHNOLOGY		473	226
DEW			
SPACE-BASED LASER			180
GROUND-BASED LASER			201
NEUTRAL PARTICLE BEAM			67
ACQUISITION, TRACKING AND POINTING			153
DE TECHNOLOGY			429
KEW			
SPACE-BASED INTERCEPTOR	285		
ERIS	165		
HEDI			115
KE TECHNOLOGY	130		241
SA/BM			
BM/C³ EXPERIMENT		114	
NATIONAL TEST BED		115	
PHASE I ENGINEERING	74		
ENGINEERING SUPPORT		159	26
BM/C³ TECHNOLOGY		131	21
SLKT			
ADVANCED LAUNCH SYSTEM		72	
SLKT TECHNOLOGY		296	422
MANAGEMENT			
HQ		12	13
TOTAL	$654	$2,251	$1,641

PHASE I	$ 654
FOLLOW-ON	2,251
BOTH	1,641
	$4,546



And if you will look and see that what I call Phase I in red on that particular pie chart, that represents the systems that are presently in our baseline approach for Phase I, and the investment that is made to those systems that are unique to Phase I.

For certain of the Phase I systems, such as the surveillance satellites, some of the ground probes, some of the radars, the battle management systems, those would be required whether or not you put Phase I weapons in place or the more advanced directed energy weapons. They have to be there, and in fact, the way to look at that is that the SDI is an entirely new surveillance and communications system in which you could insert varying types of weapons aimed at destroying ballistic missiles.

So that is represented by that "both" part, 36 percent, and with the remaining half really going into the advanced technologies for future applications.

Some of those advanced systems are not directed energy systems, for example, the rail guns and some of those kinds of efforts. So you should not interpret it as green being only directed energy and red being only kinetic energy systems, but they certainly are Phase I and follow-on phases.

And I believe that is about as good an estimate as we can make at this point.

Senator GLENN. If I understand, you are saying basically, that the green would be—and my time is up, Mr. Chairman—you would pretty much define that as future research, future systems, future phases, and then part of your yellow would be split some percentage or other between current and future systems, I gather.

General ABRAHAMSON. Well, you could say that you cannot put the Phase I system in place without that entire yellow portion, but the entire yellow portion would also apply to the green or the follow-on phases, because you must have surveillance and battle management, C^3.

Senator GLENN. Thank you. Thank you, Mr. Chairman.

Senator EXON. Thank you, Senator Glenn.

General Abrahamson, we have already accepted your full statement for the record, and I would like you to just summarize at this time. Then we will begin a round of questioning on your portion of the presentation.

STATEMENT OF LT. GEN. JAMES A. ABRAHAMSON, DIRECTOR, STRATEGIC DEFENSE INITIATIVE ORGANIZATION

General ABRAHAMSON. Sir, I am always pleased to be before this committee, and I appreciate that even though you are operating on an accelerated basis, both the members and the staff which supports the committee are always very knowledgeable and understand the program.

Since this is such a complex program, that is a key effort for our mutual success in terms of making these brief testimonies effective. That is really intended to compliment ail of you.

I do not want to go through all of the details here, but I want to point out that I do have both elements of the budget and some of the key impacts of further reductions outlined in the program.

The most important thing that I would like to emphasize on the record as I have for several other committees is, indeed, about the constancy of our goal. There have been what I consider deliberately misleading and very ineffective or poor reporting on what it is the Phase I system requires.

It has been reported that that is a shift in the overall goal of the SDI program to a more limited coverage, and in many cases that has been interpreted as the protection of weapons versus people. That is not the case at any time.

In particular, I did add the Secretary of Defense op-ed piece, and I appreciate the fact that you commented on that. I will just read one section of this.

"Critics have chosen to treat this step forward," referring to the initial Phase I system that was reviewed by the DAB, "as a retreat from the President's initial vision, citing the fact that Phase I will provide only a partial defense against missile attack. They fail to see that Phase I is a starting point, not the final system. SDI's ultimate goal has not changed. The path toward the President's vision is a staircase. Advance will come a step at a time, and Phase I is the first step."

I would recommend for everyone that the full broad editorial piece be included in the record and, therefore, Senator Thurmond's direction that that happen, I think, is much appreciated.

Thank you, sir.

[The prepared statement of General Abrahamson follows:]

STATEMENT BY

LIEUTENANT GENERAL JAMES A. ABRAHAMSON

DIRECTOR, STRATEGIC DEFENSE INITIATIVE ORGANIZATION

Mr. Chairman, thank you for the opportunity to appear before your subcommittee today along with the Under Secretary of Defense for Acquisition, the Honorable Robert Costello, to discuss the Strategic Defense Initiative (SDI) Program. Secretary Costello will address issues of ABM Treaty compliance and the Defense Science Board Review of the SDI Program. I will focus my remarks today on the overall Program, our objectives and technical accomplishments.

I would like to emphasize the consistency of our goal -- to conduct a vigorous research and technology program that could eliminate the threat of ballistic missiles and provide increased U.S. and allied security. That is the goal we share today and it is the same goal we received from the President in 1983. A few people have reported what they believe is a shift in the overall goal of the SDI Program to a more limited defensive coverage. Referencing the JCS requirements for Phase I, (which I will discuss in greater detail later) claims have been made that strategic defenses are now intended to be only partially effective, area defenses. This is not the case. As Secretary Carlucci stated in an April 12, 1988 op-ed piece, "**SDI's ultimate goal has not changed**. The path toward the president's vision is a staircase. Advance will come a step at a time, and Phase I is the first step." In case you did not have an opportunity to read Mr. Carlucci's editorial, I am attaching a copy to the end of my statement. I feel very strongly that we cannot afford to let the wrong interpretation of the JCS requirements to cloud our analysis of the usefulness of strategic defenses.

The SDI Program seeks to develop the technologies and concepts to support a phased development of antiballistic missile defenses. A Strategic Defense System (SDS) will be designed to meet and defeat the offensive ballistic missile threat not only at the time of deployment of the defenses but also in the event the threat evolves in the future in response to that defense.

In mid-September the Defense Acquisition Board (DAB) concluded a rigorous examination of the entire SDI research effort and recommended that six SDI technologies were of sufficient maturity to enter the demonstration and validation (Dem/Val) phase of the defense acquisition process. (See figure 1) The purpose of the demonstration and validation phase is to evaluate -- through analysis, experimentation, and simulation -- the feasibility of critical elements of a potential, initial phase of an SDS.

SYSTEM ELEMENT	FUNCTIONS
Boost Surveillance and Tracking System (BSTS)	• Detection of missile launches • Acquisition and tracking of boosters and PBVs • Kill assessment
Space-Based Surveillance and Tracking System (SSTS)	• Acquire and track PBVs, RVs, and ASATs • Discrimination
Ground-Based Surveillance and Tracking System (GSTS)	• Acquisition • Tracking • Discrimination
Space-Based Interceptor (SBI)	• Disabling of boosters, PBVs, RVs, and ASATs • Sensors on carrier vehicle (CV) could provide enhanced midcourse sensor capability
Exoatmospheric Reentry Vehicle Interceptor System (ERIS)	• Disabling of RVs in late midcourse
Battle Management/Command and Control, and Communications (BM/C3)	• Man-in-the-loop control • Engagement management • Maintaining track data • Target assignment • Communications

At the same time, the Defense Acquisition Review Team (DART) was formed to manage issues to be addressed and resolved by annual DAB reviews. The team is presently working towards a DAB in June which will review the current SDI Program.

Issues which were raised by the DAB that will be reviewed in June include:

- The SDI full scale development management plan
- The SDI approach to system engineering
    - Phase One Engineering Team (POET)
    - System Engineering and Integration (SE&I) contract
- Joint Air Force/SDI Boost Surveillance and Tracking System (BSTS) plan
- Cost estimates and COEA
- Discrimination, Lethality, and Battle Management/Command, Control, and Communications
- Continuing environmental impact analysis
- An integrated contracting plan

The POET is already operating within SDIO. The SE&I contract will be awarded in May, 1988. The Air Force/SDIO BSTS report is due in June, 1988. The remaining requirements are in coordination and will be available for the June review by the DAB.

As a key part of the process leading to the DAB recommendation, the Joint Chiefs of Staff (JCS) formally defined ballistic missile defense operational requirements for Phase I. The JCS recognized that these initial requirements, if achieved, represented the first step toward the President's goal of "eliminating the threat posed by strategic nuclear missiles." Additionally, they provided the SDIO an operational benchmark, essential in our process to determine the feasibility of deploying a thoroughly reliable defense against nuclear ballistic missiles.

The SDIO used these requirements to identify the most effective, balanced architecture that would meet JCS Phase I operational goals and permit evolutionary growth capability. We have examined the effectiveness of the Phase I SDS under a broad variety of stressing scenarios and our analyses show that the DAB-approved Phase I SDS should be capable of meeting the JCS requirement. Thus, our strategy for the SDS is to proceed with the demonstration and validation of those system elements approved for Phase I while continuing a balanced research effort in support of concepts for follow-on phases of a future SDS.

Some recent suggestions have been made, notably by the Chairman of the Senate Armed Services Committee, Senator Sam Nunn, other Senators, Congressmen, and some highly distinguished experts in strategic policy planning and technology, that DoD should begin to review the possibility of deploying systems for use against an accidental launch. In response, we have initiated studies to examine the practical possibilities, cost, and effectiveness of accidental launch options. An important issue is the relationship between these options and the technologies in our baseline Phase I architecture. We are undertaking those studies seriously and initial results will be available in the Spring and Summer for consideration by the appropriate decision makers and discussion with the Congress. As part of our ongoing and systematic review of the SDI Program we will be considering a range of options and alternative architectures.

The SDI Program has come under considerable criticism in the past year for an emphasis on "early deployment" options at the expense of far-term technologies. This is not the case. The research continues to be balanced between mature and advanced technologies. We have not sacrificed the technology efforts for directed energy concepts while promoting Phase I elements.

Even after the DAB decision to proceed with Dem/Val of Phase I elements, Directed Energy continues to receive the second largest, next to Sensors, allocation our very limited budget. Further, it is important to recognize the funding for Kinetic Energy projects also includes projects that are not part of the Phase I effort. Specifically, the High Endoatmospheric Defense Interceptor (HEDI) is not part of the Phase I elements approved for Dem/Val, nor is the hypervelocity rail gun, with their supporting advance technology programs. Both are viable technologies for follow-on phases that continue to be supported through Kinetic Energy Program Element. Finally, had we not invested in several of these Kinetic Energy systems and their supporting technologies, such options as accidental launch protection would not even be available to be considered.

One of the more prominent follow-on projects being conducted by SDIO is the Zenith Star project. The Zenith Star project is currently in the study phase. The object of the study is to develop an experiment design and concept to meet SDIO criteria and to ensure that it will be consistent with the ABM Treaty. The proposed Zenith Star experiment is being reviewed for compliance with the ABM Treaty. As a result of the compliance review conducted to date, it appears that such an experiment using the Alpha Laser and the LAMP Mirror and various optical sensors could be conducted in a compliant manner. This experiment is important as it will help SDIO establish the feasibility of space-based directed energy concepts for follow-on phases.

President Reagan, Mr. Carlucci, and all of us fully recognize the importance of follow-on technologies to the success of a SDS. We must be capable of addressing the evolving threat from the Soviet Union. Our research efforts must have the obvious potential of countering a broad range of Soviet responses. By demonstrating that those responses can be countered we will discourage Soviet efforts in those directions. This will save both their resources and our own. I call this a research strategy of "branching and blocking". We have not created a situation where Phase I is the end -- it will be the beginning.

Last year's budget reduction of 32% off the requested level represented greater reductions than any other major DoD Research and Development (R&D) effort. The Army R&D account was reduced by 15%, the Navy R&D account by 9%, and Air Force R&D by 19%. On average, defense agencies were reduced by only 8%. None of the programs conducted in these accounts are comparable to the effort required of the SDI research program. Principally, the reductions to the SDI Program for fiscal year 1988, along with the reductions in the out years that logically flowed from those cuts, will cause a delay of one or two years in the overall program structure. Some of the budget impacts to the Program Elements include:

Programs and Systems: For the Strategic Defense System (SDS) Phase I project the Systems Engineering and Integration effort was reduced. This will delay the system requirement definition and a Milestone II decision on the Phase I SDS. Reductions to the SDS Engineering and Support project will delay manufacturing initiatives, reduce integrated logistics support studies, and severely curtail the producibility program. The result of these adjustments is increased risk in new technologies and delays to designed-in supportability an high payoff areas such as on-orbit support, and critical impact on our ability to address affordability.

Reductions to the Battle Management/Command, Control, and Communications BM/C3 program have caused a 1-year delay to both the Command Center and the Network experiments. These delays also result in a 1-year delay to the integrated experiment. Finally, reductions to the National Test Bed project will cause a delay in achieving an initial operating capability. The result will be increased risk to the validation of BM/C3 concepts.

Sensors: Congressionally mandated cuts to the SDI Program have had a serious impact on the Space Surveillance and Tracking System (SSTS) program. Appropriated funds are considerably less than requirements for the two concept definitions contracts which were awarded in the last quarter of FY 1986. This shortfall has forced the Systems Programs Office to renegotiate both contracts thereby adding costs, increasing risks, and delaying critical technology demonstration programs. The Ground Surveillance and Tracking System technology validation experiment will be seriously impacted as well.

Kinetic Energy Weapons: The most visible impact on ERIS of the FY 1988 funding reductions was a slip in the first ballistic flight at the Kwajalein Missile Range. The $60 million reduction to the ERIS program caused prime contractors and related subcontractors to be restructured and forced significant reductions in contractor and government agency efforts. Funding reductions have also forced significant restructuring of the HEDI program. Flight tests at White Sands Missile Range were reduced, thruster and control work was deferred until FY 1989, ground test were reduced by half.

Reduced funding levels now appears to be the only impediment to the building of a weapons-grade hypervelocity gun. The near-term hypervelocity system would support the area of ground-based terminal defense.

Directed Energy Weapons: In the area of chemical laser technology, all major technology base programs have slipped one year. Free electron laser efforts supporting the ground-based free electron laser technology integration experiments have been downscoped. Space-based free electron laser activities have been severely curtailed. In the Neutral Particle Beam technology project, there has been a fifty percent reduction in the FY 1988 and FY 1989 programs.

Survivability, Lethality, and Key Technologies: All subsystem and system level validation testing of survivability technologies were deferred until FY 1989. The theater defense portion of the lethality project was reduced. Non-nuclear megawatt projects in the Power and Power conditioning project have slipped. The SP-100 GES project has been slipped and some ground tests reduced in scope. Follow-on work for the ground power study and the SPAS have been eliminated.

The amended fiscal year 1989 budget request submitted to Congress in February reflects our best assessment of where our money needs to be spent to keep the Program on a course consistent with our original goals and objectives. We readjusted our request for fiscal year 1989, as did the entire Department of Defense, in accordance with the agreement reached with congressional leaders. The entire Department was asked to cut nearly $33 billion from its budget request. All the Services and agencies have felt the pinch of austerity. We were asked, however, as pragmatic Program Managers to closely scrutinize our budget requests and present what we considered to be the absolute minimum necessary to conduct our programs without jeopardizing national security. I consider the $4.5 billion request for DoD SDI efforts to be the absolute minimum request, which is both necessary to conduct reasonable SDI research efforts and to ensure a technical feasibility decision in the early 1990's. Our request is a figure which is consistent with the total defense budget request, agreed to at the budget summit.

Cost management is a premier goal of the Strategic Defense Initiative Organization. We recognize that the cost of defense equipment, including its research, development, production, and support must be reduced to affordable levels. The SDI Program has a dynamic and multi-faceted cost and affordability program to guarantee that candidate strategic defense systems and technologies meet these stringent goals.

We continually review our system requirements to ensure that only absolutely essential capabilities are called for. We are investing in research on equipment technology which will allow us to accomplish missions more inexpensively. We are also investing in production technology which will assure we can build systems more inexpensively.

As a result of all these steps, we are bringing about real changes in the nature of the products and processes of our business, and this makes the SDI cost estimating requirements very challenging. We are studying and learning from acquisition history to understand the labor and material requirements of past programs, and (to an appropriate level of detail) adjusting data, factors or cost estimating equations to reflect this new way of doing business. To date, our estimates for the DoD Cost Analysis Improvement Group (CAIG) and the DAB process (i.e., $75 to $150 billion acquisition costs) have been developed by traditional means. In the future, we will capture the cost reducing effects of these very fundamental changes in the systems acquisition process. Initially, we will establish challenging but attainable cost goals, and then, over time, we will drive our fiscal requirements down.

As I mentioned in my opening remarks, the SDI Program has experienced many successes over the years. I would like to take a few moments to highlight two of the more recent successes that clearly demonstrate the breadth of research we are conducting under the SDI Program. This year, SDIO achieved a milestone by successfully conducting the most complex space experiment ever attempted by the United States--Delta 181. The Delta 181 experiment was a success as we met our four primary objectives: characterization of rocket plumes; characterization of various test objects in a space environment; characterization of backgrounds that will be encountered by a space-based Strategic Defense System; investigation of spacecraft glow and various release phenomena in a space environment. Three of the four secondary objectives were also met.

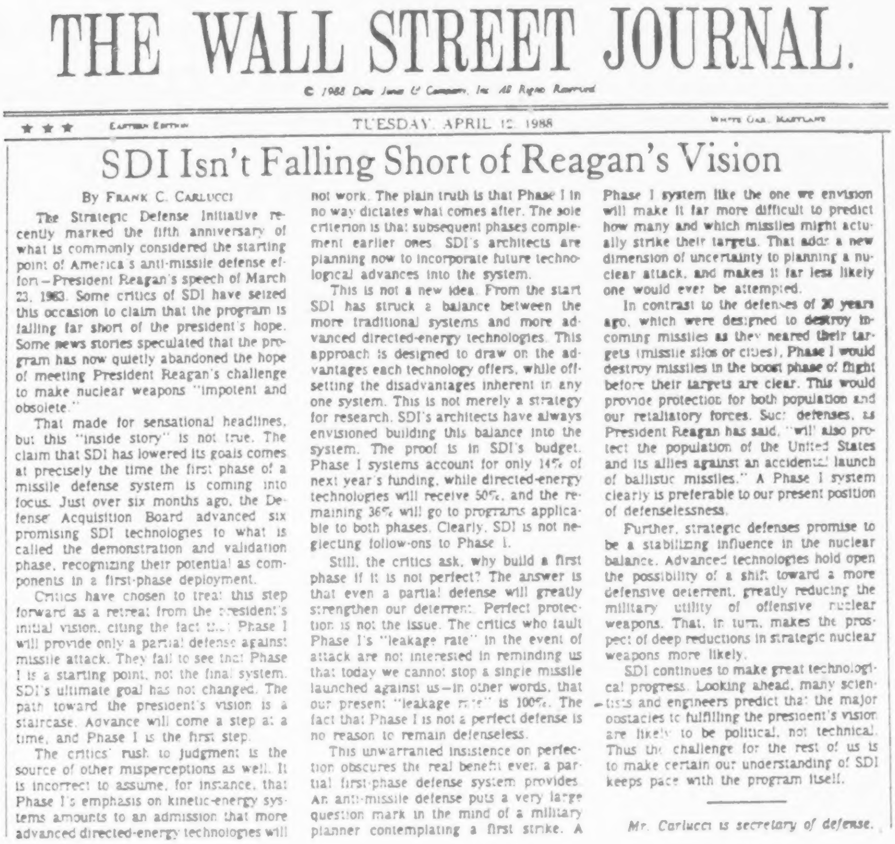
The Delta 181 experiment was designed as a research and development mission to support aggressive, basic phenomenologic research in strategic defense. The data collected and experiences gained by through the Delta 181 mission has had an immediate influence on SDI research.

I also want to take the opportunity to share with you the progress that we are making in sharing the results of our research with other DoD, federal and state agencies and the private sector. We are doing this not in any way to justify the program because of its technological spin-off, but rather because we would be remiss if we did not make every effort to provide a vehicle for access to these technologies within the context of National security considerations.

Toward that end, I established an Office for Technology Applications within the SDIO and charged a small, but dynamic group of people to forge a link between those conducting SDI research all over the Nation with other programs within the DoD and civilian sector who had a legitimate need for the technology. One example of this is the Medical Free Electron Laser program which was established as the direct result of congressional foresight. The Congress has authorized approximately $15 million per year, under SDI management, for the Medical Free Electron Laser Program. Our program is establishing centers in California, Tennessee, Maryland, New York, and North Carolina. Laser technology is being applied to a host of medical research applications with some early, exceptional results: A process has been developed at Massachusetts General Hospital to fragment kidney stones using a pulsed laser. The clean cutting of bone (osteotomy) without charring has also been achieved by researchers from Utah. This technique has significant promise to simplify and shorten the time for the delicate surgical procedures in joint surgery such as the replacement of fractured hip joints in elderly patients. On an experimental basis, a laser technique has been developed which has demonstrated the purging of Leukemia cells from bone marrow. Those same researchers have also demonstrated that the entire family of viruses (which includes Herpes, Measles and HIV) are susceptible to photoactive destruction when exposed to laser light. The research has evolved a process which could be used one day to cleanse the blood supply of the AIDS virus in blood bank applications. Work is continuing to extend and improve the process using the capabilities of the Free Electron Laser.

These are but a few of the exceptional advances in technology that are coming about as a result of the fine work by so many talented SDI researchers from all over the nation. We are confident that this progress and progress in other areas will provide a significant return on the investment of the American people in this program.

The SDI Program has advanced tremendously since our beginning in 1983. We have proven the feasibility of intercepting a missile in the endo-and exo-atmosphere as well as space (FLAGE, HOE, and Delta 180 experiments). We have confidently advanced the means of discriminating targets from decoys (Delta 181). And, we have proven the feasibility of propagating a low power laser beam to space (Maui experiment). These advancements allow us to believe, quite credibly, in the overall feasibility of strategic defenses. The United States will be able to defend itself against ballistic missile attack.



THE WALL STREET JOURNAL.

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★ ★ ★ Eastern Edition TUESDAY, APRIL 12, 1988 White Oak, Maryland

SDI Isn't Falling Short of Reagan's Vision

By Frank C. Carlucci

The Strategic Defense Initiative recently marked the fifth anniversary of what is commonly considered the starting point of America's anti-missile defense effort—President Reagan's speech of March 23, 1983. Some critics of SDI have seized this occasion to claim that the program is falling far short of the president's hope. Some news stories speculated that the program has now quietly abandoned the hope of meeting President Reagan's challenge to make nuclear weapons "impotent and obsolete."

That made for sensational headlines, but this "inside story" is not true. The claim that SDI has lowered its goals comes at precisely the time the first phase of a missile defense system is coming into focus. Just over six months ago, the Defense Acquisition Board advanced six promising SDI technologies to what is called the demonstration and validation phase, recognizing their potential as components in a first-phase deployment.

Critics have chosen to treat this step forward as a retreat from the president's initial vision, citing the fact that Phase I will provide only a partial defense against missile attack. They fail to see that Phase I is a starting point, not the final system. SDI's ultimate goal has not changed. The path toward the president's vision is a staircase. Advance will come a step at a time, and Phase I is the first step.

The critics' rush to judgment is the source of other misperceptions as well. It is incorrect to assume, for instance, that Phase I's emphasis on kinetic-energy systems amounts to an admission that more advanced directed-energy technologies will not work. The plain truth is that Phase I in no way dictates what comes after. The sole criterion is that subsequent phases complement earlier ones. SDI's architects are planning now to incorporate future technological advances into the system.

This is not a new idea. From the start SDI has struck a balance between the more traditional systems and more advanced directed-energy technologies. This approach is designed to draw on the advantages each technology offers, while offsetting the disadvantages inherent in any one system. This is not merely a strategy for research. SDI's architects have always envisioned building this balance into the system. The proof is in SDI's budget. Phase I systems account for only 14% of next year's funding, while directed-energy technologies will receive 50%, and the remaining 36% will go to programs applicable to both phases. Clearly, SDI is not neglecting follow-ons to Phase I.

Still, the critics ask, why build a first phase if it is not perfect? The answer is that even a partial defense will greatly strengthen our deterrent. Perfect protection is not the issue. The critics who fault Phase I's "leakage rate" in the event of attack are not interested in reminding us that today we cannot stop a single missile launched against us—in other words, that our present "leakage rate" is 100%. The fact that Phase I is not a perfect defense is no reason to remain defenseless.

This unwarranted insistence on perfection obscures the real benefit even a partial first-phase defense system provides. An anti-missile defense puts a very large question mark in the mind of a military planner contemplating a first strike. A Phase I system like the one we envision will make it far more difficult to predict how many and which missiles might actually strike their targets. That adds a new dimension of uncertainty to planning a nuclear attack, and makes it far less likely one would ever be attempted.

In contrast to the defenses of 20 years ago, which were designed to destroy incoming missiles as they neared their targets (missile silos or cities), Phase I would destroy missiles in the boost phase of flight before their targets are clear. This would provide protection for both population and our retaliatory forces. Such defenses, as President Reagan has said, "will also protect the population of the United States and its allies against an accidental launch of ballistic missiles." A Phase I system clearly is preferable to our present position of defenselessness.

Further, strategic defenses promise to be a stabilizing influence in the nuclear balance. Advanced technologies hold open the possibility of a shift toward a more defensive deterrent, greatly reducing the military utility of offensive nuclear weapons. That, in turn, makes the prospect of deep reductions in strategic nuclear weapons more likely.

SDI continues to make great technological progress. Looking ahead, many scientists and engineers predict that the major obstacles to fulfilling the president's vision are likely to be political, not technical. Thus the challenge for the rest of us is to make certain our understanding of SDI keeps pace with the program itself.

Mr. Carlucci is secretary of defense.

	FY86	FY87	FY88 Request	FY88 APPN	Change	FY89 Request	FY89 ABS	Change
Surveillance, Acquisition, Tracking, and Kill Assessment								
Radar Discrimination and Data Coll	18.926	12.110	21.754	16.267	-5.487	33.634	22.000	-11.634
Optical Discrimination and Data	108.466	93.480	84.611	99.355	14.744	77.676	122.000	44.324
Microwave Radar Tech	27.465	24.541	30.780	18.585	-12.195	36.969	25.000	-11.969
Laser Radar Tech	69.350	87.236	142.763	90.645	-52.118	172.254	110.000	-62.254
Passive Sensor Tech	74.299	71.723	90.195	60.963	-29.232	95.795	90.000	-5.795
Signal Processing Tech	86.798	91.621	120.546	71.478	-49.068	140.737	94.000	-46.737
Interactive Disc Tech	6.300	15.660	36.485	22.083	-14.402	58.831	20.000	-38.831
Boost Dem/Val	73.181	127.050	246.513	200.993	-45.520	334.389	179.000	-155.389
Midcourse Dem/Val	43.716	38.575	184.615	28.416	-156.199	234.901	90.000	-144.901
Midcourse Experiment	122.711	109.830	100.056	114.180	14.124	136.457	84.000	-52.457
Terminal Dem/Val	28.748	24.700	112.653	37.244	-75.409	132.258	73.000	-59.258
SATKA Support	103.274	118.240	233.219	97.701	-135.518	301.858	106.800	-195.058
Shuttle Recovery	0.000	13.800	0.000	0.000	0.000	0.000	0.000	0.000
Support Programs	84.731	93.606	79.500	97.628	18.128	102.771	107.825	5.054
TOTAL SATKA	843.956	927.986	1492.680	955.523	-537.157	1859.530	1124.625	-734.905
Directed Energy Weapons								
CL Technology	125.318	86.961	86.600	108.500	21.900	95.000	281.000	186.000
FEL Technology	143.861	184.253	212.000	155.500	-56.500	266.000	229.000	-37.000
NPB Technology	83.573	144.703	200.000	102.600	-97.400	250.000	120.000	-130.000
ATP-FC Technology	247.983	238.740	254.500	248.580	-5.920	276.550	220.000	-56.550
MIRACUT	18.650	36.744	27.400	20.000	-7.400	10.000	0.000	-10.000
COT/Emerging Tech	142.954	97.459	210.179	159.880	-50.299	202.618	150.200	-52.418
Support Programs	33.720	63.271	113.001	37.266	-75.735	144.652	49.684	-94.968
TOTAL DEW	798.029	853.131	1103.680	832.326	-271.354	1245.820	1029.894	-215.926
Kinetic Energy Weapons								
Space-Based Interceptor Dev	135.162	118.768	296.259	204.730	-91.529	350.499	330.000	-20.499
Exoatmospheric Interceptor Dev	61.525	104.474	209.800	137.750	-163.579	294.100	202.000	-92.100
Endoatmospheric Interceptor Dev	78.689	100.086	226.000	112.100	-113.900	228.300	150.000	-78.300
Miniature Projectiles Tech	55.356	72.861	99.359	66.650	-32.709	130.633	77.000	-53.633
Test and Evaluation	198.655	238.099	100.797	162.120	61.323	43.000	31.000	-12.000
Technology Support	28.803	43.927	75.899	56.850	-19.049	78.211	84.900	6.689
Support Programs	40.050	43.269	66.596	51.329	-15.267	74.907	61.394	-13.513
TOTAL KEW	596.042	722.493	1074.730	791.549	-283.181	1199.650	936.294	-263.356
Systems Analyses and Battle Management								
SDS Phase I Engineering	0.000	0.000	0.300	27.500	27.200	0.400	74.500	74.100
SDS Engineering and Support	74.213	88.880	117.272	111.000	-6.272	119.817	135.000	15.183
Theater Defense	1.700	33.417	40.387	41.500	1.113	50.684	31.400	-19.284
BM/C3 Technology	68.133	83.165	119.251	70.900	-48.351	131.432	106.000	-25.432
BM/C3 Experimental Systems	23.053	67.954	165.096	99.100	-65.996	195.708	114.000	-81.708
National Test Bed	11.722	46.529	110.800	87.000	-23.800	207.180	115.000	-92.180
Support Programs	33.477	65.845	74.234	66.156	-8.078	82.286	63.994	-18.292
TOTAL SA/BM	212.348	385.790	627.340	503.156	-124.184	787.510	639.894	-147.616
Survivability, Lethality, and Key Technology								
Systems Survivability	44.957	58.683	93.339	100.205	6.866	97.461	175.400	77.939
Lethality and Target Hardening	80.279	78.380	101.606	74.741	-26.865	97.582	98.000	0.418
Power and Power Conditioning	46.572	83.887	158.550	99.318	-59.232	185.396	182.000	-3.396
Space Transportation and Support	18.759	82.589	429.840	80.000	-349.840	601.288	200.000	-401.288
Materials and Structures	2.083	13.821	22.307	26.136	3.829	40.149	54.000	-13.851
Support Programs	21.352	59.933	96.721	69.720	-27.001	140.317	81.014	-59.303
TOTAL SLKT	214.002	375.300	900.363	448.670	-451.693	1162.189	790.414	-371.775
Management Headquarters	12.772	20.025	22.000	19.776	-2.224	27.330	24.790	-2.540
TOTAL RDT&E RESOURCES	2675.149	3279.725	5220.793	3551.000	-1669.793	6282.029	4546.111	-1735.918
Military Construction	3.080	10.300	125.196	59.196	-66.000	18.000	90.300	+72.300
TOTAL DEPARTMENT OF DEFENSE	2678.229	3290.025	5345.989	3610.196	-1735.793	6300.029	4636.411	-1663.618
DOE SDI Program	284.900	360.300	569.100	353.800	-215.300	390.300	402.000	11.700
TOTAL SDI PROGRAM DOD/DOE	2963.100	3650.300	5915.100	3964.000	-1951.100	6690.300	5038.400	-1651.900
NASA ALS	0.000	39.000	0.000	70.000	70.000	0.000	—	—

* NDEW efforts only.

Senator EXON. Thank you, General, very much.

COST OF PHASE I

Last year at about this time, you were quoted as estimating the cost of Phase I at $40 to $70 billion. By late last year, your quoted esimate was up to $75 to $150 billion for acquisition costs. That is roughly doubling of the estimate in a year.

Does this just reflect bad initial estimates, or are we seeing cost growth here as well, or have substantial additional concepts come into thinking between those two drastically different estimates?

General ABRAHAMSON. I think, sir, as I indicated initially that that $40 to $60 billion was a very rough estimate based on an initial study and had not gone through the full discipline of the CAIG and the Defense Acquisition Board process.

That discipline has now been applied, and that is why we came to this $75 to $150 billion.

It did represent some additional content, some additional things that were included there, not new weapons systems but a better definition of exactly what systems would be required. That kind of process is an ongoing process. In some cases the costs will go up as we get better definition. In other cases they will go down.

It is my clear intent to force those estimates down to something that will be something substantially more affordable. That, by the way, does not only apply to a near-term or Phase I system, it also applies to the future systems that might come later on, even some directed energy systems.

An example of that is that, given the very major cut that we had to find a way to accommodate in our last year's budget, there were large cuts taken from such projects as the free electron laser. That does not reflect that those teams who have been working on the physics of the free electron laser have not made substantial progress.

Unfortunately, they have made great progress in that particular area. However, as we look at the optical systems that have to go with those, those appear to be much more expensive than I was willing to accept.

Therefore, given the fact that I had to make a cut and that I had to allocate it, it seemed reasonable to me to slow down some of the work on the physics of the particular devices while we go back and apply just as much creative thinking as we can to the optical high cost elements so that we can get those systems back in phase when the time comes.

Senator EXON. General, can you tell us what exactly is included in this $75 to $100 billion estimate of acquisition costs? Does it include deployment costs? Does it include development costs for the advanced launch system? Does it include R&D on Phase II and follow-on systems up to the point where Phase I is fully deployed? Can you separate some of this out for us?

General ABRAHAMSON. It separates out the remaining investment in the research program but does include the development costs and the production and deployment costs of such a system.

It does not include 10 years of life cycle costing. Frankly, that is a very difficult process to understand that for some of these advanced systems.

Senator EXON. Does it include any R&D on Phase II?

General ABRAHAMSON. No, sir, that is a separate item.

Senator EXON. It does not, then?

General ABRAHAMSON. That is correct.

Senator EXON. I would like to get a general guesstimate on what the spending will be annually while Phase I is in full-scale engineering and development.

First, is FSED going to be more expensive than current demonstration validation? Where are we on that and the phases that are going to follow?

General ABRAHAMSON. I think that is an important question, and I am really pleased to try to point out a very significant difference between research and the way we are conducting research in this program and the development phase of such a program.

For example, the kinds of systems that are being researched and would be demonstrated experimentally, we do not go through all of the qualification that is required for a fully operational system. In other words, that would be going beyond research, we believe, and not the intent either of the congressional appropriation or a wisely laid out program.

In some cases, however, just as I have indicated, it does include investment and research in new production techniques, such as finding the machinery, the equipment, the automated techniques of producing low cost components.

Again, it would not be a fully qualified production line, but it would show us that we can bring down the cost of some of the most expensive elements of the system.

Now, if we have done that job right, truly right, two benefits will occur. One of them is that we will be able to make much better cost estimates for the Department of Defense and this future administration as they make their decision about going ahead into the development phase of the program, because we will have identified the risk areas and done the research necessary to eliminate a substantial amount of that risk.

There will be costs, however, associated with the final qualification, some redesign in order to add new technology, and certainly the final production and deployment costs for such a system.

So, therefore, the structure of the program is such that in order to answer the questions that I have talked about quite consistently and for which the President has provided us a set of criteria, i.e. will it be survivable, will it be militarily effective, and will it put us on the right end of a cost strategy with the Soviet Union, we have to carry the research program further than we have done with many systems.

Now in that sense I think we are consistent with the Packard Report and many of the congressional reports in that we are not rushing forward into a development phase. We are truly investing quite heavily into the reduction of risk early in the system. So when that development decision is made, it can be made with a great deal of certainty about each of those areas.

I think that we have gone further in this direction which has been outlined now both in the Congress and in many other places and, by the way, it is consistent with the policy that the Department of Defense and some of the initiatives that Dr. Costello is implementing.

Senator EXON. General, this is my last question, at which time I will recognize the next Senator.

FULL SCALE ENGINEERING COSTS

Having listened to your explanation, I guess it would be fair to say that once you get to full-scale engineering development, it will cost more per year, will it not?

General ABRAHAMSON. It surely will cost more in terms of comparing it to the amount of research that we have now.

It is my hope, however, that if we have done that job right that we could accomplish the development phase of the program more quickly than we have many of our other systems and at a much lower cost because we have made this investment.

Senator EXON. Much lower costs?

General ABRAHAMSON. Much lower costs than compared with some present systems. For example, the MILSTAR satellite today, that is an expensive satellite in development.

Senator EXON. Because you are doing it this way, it is going to be more expensive when we get into the full-scale development, but it might not cost as much as other programs because you are using a different method?

General ABRAHAMSON. Yes, sir.

Senator EXON. Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

PHASE I SDI DEPLOYMENT

General Abrahamson, did the JCS requirement for Phase I SDI deployment take into account Soviet ABM deployment of similar effectiveness in arriving at the number of soviet ballistic missiles that it must defeat?

General ABRAHAMSON. First of all, we can provide much more detailed answers to your questions in classified answers for the record; however, let me try to answer it in an unclassified and general way.

The JCS requirement took into account the intelligence community's best estimate of how the Soviets could respond to an SDI system in such a way, for example, as to build a large number of new offensive systems.

I cannot comment on whether or not it very carefully examined the question of a Soviet ABM deployment in the process.

Senator LEVIN. When you say you cannot, is that because we are not in a classified setting or because you do not know the answer?

General ABRAHAMSON. I was not privileged to all of the discussions that the JCS had on the subject. However, it is very obvious that when we have a deployment, that can only occur when we are on both sides loosened from the requirements of the ABM Treaty and, therefore, it is hard to predict exactly what the Soviets might encounter or might do.

Senator **Levin**. Basically, then, you are saying you just do not know?

General **Abrahamson**. That is correct.

Senator **Levin**. This is on a different subject now.

In your prepared statement you noted that last year's budget reduction of 32 percent off the requested level represented greater reductions than any other major DOD R&D effort.

General **Abrahamson**. That was not cut out entirely.

Senator **Levin**. You are referring there to a reduction of 32 percent for SDI?

General **Abrahamson**. Yes, sir.

Senator **Levin**. You then pointed out in your prepared testimony that the Army R&D account was reduced by 15 percent, the Navy R&D account by 9 percent, and the Air Force R&D by 19 percent, and you were there referring to off the requested level again; is that correct?

General **Abrahamson**. Yes, sir.

Senator **Levin**. What you do not mention, and I am wondering whether you are aware of this, is that the SDI program ended up receiving real growth despite that cut from the request, whereas all three of those service R&D accounts received real cuts. Is that accurate?

You received real growth in any event last year; is that correct?

General **Abrahamson**. Yes, sir, I did. By the way, I believe in testimony each time that I have been before the various committees, I have recognized that and I have appreciated that particular fact.

I think that does represent a wise choice and a bipartisan approach to the program, and I do appreciate it.

The reason that I made that particular comment in that particular context is that one of the difficulties in conducting the program has been that we have tried in many cases to continue to build and to try to offset some of the problems that we had in the cuts in the year before.

Then when we get a cut of that particular size, that means that I have to cause a great deal of disruption in the program as we cut it back.

It was not intended not to recognize that particular thing.

Senator. **Exon**. When you make references to cuts as you just did twice in this last sentence, I think that it ought to be made clear that you are talking about cuts from a requested level, not cuts from the level of the prior year, because it does tend to give a very different impression.

You received a large increase last year or an increase last year, not as large as requested, but still an increase. So I do think it is important, particularly in light of real cuts in other R&D programs, that when you use the word "cut" you add the words "cut from the requested level", or else the impression is out there that you had a cut from the prior year's level.

General **Abrahamson**. Sir, I accept the point. It is a very good point.

I think it also calls attention to the fact that this year in our approach to the budget and in our approach to the request, we already made that very substantial cut from what we thought was both necessary and useful, and that very substantial cut having been made by the Department of Defense prior to the time that the President's request was put on the table.

I hope that that would be considered in the same way as you deliberate the budget.

Senator Levin. Mr. Chairman, my time is up.

Could I ask that something be made part of the record here?

Senator Exon. Certainly.

Senator Levin. I would request that the record incorporate a portion of the transcript of President Nixon's remarks to the American Society of Newspaper Editors on April 15, where he made reference to the broad and narrow interpretation.

In part, it reads, "As far as what was presented to the Senate, it was what we called a narrow interpretation. There is no question about that."

So Senator Nunn is absolutely correct on that point. I will not quote the rest because my time is up, but there is another portion which is very important in terms of how we should proceed in the negotiating record, which I also would ask be part of the record.

Senator Exon. Without objection, also so ordered.

Senator Levin. Thank you.

[The information referred to follows:]

REMARKS OF FORMER PRESIDENT RICHARD NIXON AT THE CONFERENCE OF THE AMERICAN SOCIETY OF NEWSPAPER EDITORS

Question. Mr. President, I'm Joseph Stern from the Baltimore Sun. You described the INF Treaty as a "done deal." But when it goes before the Senate, a major question is going to be whether the testimony offered by your administration in 1972, and the whole legislative history of the ABM Treaty, is subject to reinterpretation by future administrations. Senator Nunn has described this as a major constitutional question. When your officials were testifying on the ABM Treaty, did you ever anticipate that a succeeding administration would try to reinterpret that testimony?

President Nixon. No, I did not. [Pause.] [Laughter.] Let me say, I—didn't mean to try to cut you off. I'm simply—I was going to say that there is, here a constitutional argument, as you know. On the one side, it is said that what a treaty means is what—how it was presented to the Senate. Since the Senate has to advise and consent, a treaty must—it means whatever was presented to the Senate. As far as what was presented to the Senate was concerned, it was what we call the narrow interpretation. There is no question about that. And so Senator Nunn is absolutely correct on that point.

On the other hand, there are those who say—and here is where the counsel, of course as you know, for the State Department, who has taken that line—who say that what a treaty really means is how was it negotiated with the adversary, in this case the Soviet Union. And that in the negotiating with the Soviet Union, the broad interpretation was possible. That was the point.

Now, let me express my own view, though, about how we ought to deal with that and SDI in the future, because I think that would be a followup question that you might have. I don't go along with those that say that what we should do is to go forward with SDI, and just say that we accept the counsel from the State Department's interpretation. Because if you do that, you're going to find that the Senate, particularly with Nunn, a very powerful Senator there, is—will then block the funds for it. So that isn't going to work.

What I feel about the SDI thing is that we should first determine what our national security requires. We will then determine, if we want to go forward in SDI, we determine what we have to do. If we believe that is within the treaty, we should negotiate that, discuss that, with the Soviets. If they accept our interpretation, we go forward with it. If they do not accept our interpretation, then we have a choice. As you know, the ABM Treaty provides that if supreme national interests are involved, that then you can give 6-months' notice and go out of the treaty. And my view is let's start, first, what does the national security require? If it requires SDI, then go forward with it and then see if you can do it within the treaty. If you can't then break out of the treaty—by "breaking out" I mean give the notice and go forward in that way. That's the only way to do it.

Senator EXON. Senator Nunn.

Senator NUNN. Thank you, Mr. Chairman. I have just one other question. I am trying to catch up and read as much of the testimony as I could, and I think I have covered it, since we did not have the opening statements.

COST ESTIMATES

General, in terms of the cost estimate of getting to the point of the FSED, do you have a cost estimate that you could give us as to how much research and development money is going to be required to get to that FSED; In other words, when an informed decision could be made, even a ballpark figure?

General ABRAHAMSON. Sir, I do not have a good estimate. Part of it has to do with estimating not the Phase I system, which I think we now have a much better understanding of, but the time and the research involved to get to follow-on kinds of systems.

We have a great deal of information that we are accumulating and that is becoming more and more accurate about the systems that are based on mature technologies that we understand and understand quite effectively. We have less information about those follow-on systems.

The reason that that is important to your question is that, as I have indicated before and as it was a focus of some of Senator Glenn's concerns in an earlier testimony, I believe there is a relationship between prior to the time that you go ahead with a Phase I system that you should have some reasonable confidence that we will be able to go ahead and progress reasonably for a Phase II or follow-on capability.

What is really, therefore, a key issue in your question is how much confidence one has or one needs.

We are trying to address that as responsibly as we can. One way you will see in the Report to the Congress on SDI this year, where we have tried to lay out what we call confidence curves with a series of specific tests and what is a calibrated but subjective judgment about how each of those tests contributes to that overall confidence.

We are continuing to try to come to a good enough definition of the kinds of issues that one would like to be able to understand fully so that you can make that judgment. This is not what I would hope would be considered a lame excuse but what I hope would be a credible approach to research the unknown here.

SDI PROGRAM

Senator NUNN. Let me ask another question which is a different question but would give us more information than we currently have at least in unclassified forum.

Do you have a 5-year unclassified number for the SDI program as you now envision it?

General ABRAHAMSON. We have a FYDP number which represents an affordability judgment within the Department of Defense and represents an allocation about how much should be spent for

SDI research and how much should be spent for other programs. We have laid that out quite clearly.

Senator NUNN. Is that an unclassified number?

General ABRAHAMSON. I am reminded that the POM that we present is classified, but it is available to the committee.

Senator NUNN. Is it just SDI that has that classification, or is the whole POM?

General ABRAHAMSON. No, sir. I believe it is the entire POM which is classified.

Senator NUNN. So it would be hard to break that out, I suppose?

General ABRAHAMSON. Yes. I think that violates the rules under which the program objective memorandum is presented.

Senator NUNN. General, do you consider the SDI program as requested, not as funded but as requested, to be a crash program or a basic fiscally constrained program?

General ABRAHAMSON. I consider it to be a fiscally restrained program.

Senator NUNN. The Fletcher Commission, as you know, laid out two profiles, one for a crash program and the other for a fiscally constrained program. During the 1984 to 1988 time period, adjusted to then year dollars, they recommended $14 billion for that time frame. Basically, what has been funded to date by the Congress has been $13 billion. So about somewhere in the neighborhood of 90 percent has been funded under that profile.

Yet, your testimony indicates we have gotten several years behind in all sorts of areas here. Now, that indicates that either we are spending more than the Fletcher Commission anticipated or there is something that has changed since the Fletcher Commission made that profile.

Were they wrong?

General ABRAHAMSON. I am not familiar enough with how the Fletcher Commission arrived at their cost estimate to answer that effectively, sir. I would like to be able to respond by carefully going back and understanding that and then providing it for the record.

Senator NUNN. Of course, they were doing that at a time when the program was barely under way. Very easily it would not be the first time an estimate has been under, but I would like your comments on whether we are following that fiscally constrained pattern, they were talking about as opposed to a crash program. You have already answered that. If so, what has changed? You would think that with 90 percent of the funding there would be some slippage but not to the degree that is reflected in your statement if they were correct in their assessment.

Could you furnish that for the record?

General ABRAHAMSON. Yes, sir, I will.

[The information referred to follows:]

The Fletcher Commission estimated the 1984-88 cost of a fiscally constrained program to be $13 billion. The technology limited program for the same period was just over $16 billion. Both these figures are in 1983 dollars and include both DOD and DOE funding. Taking into account inflation, Congress has provided 92 percent of the Fletcher Commission fiscally constrained program for fiscal year 1984-88, but only 73 percent of the amount for a technology limited program. The cuts represented by actual funding from the technology limited program have accumulated over the years where many efforts have been delayed several years.

I would note, however, the early DOD estimate of funds to successfully conduct a 5-year research program as envisioned by the Fletcher panel was $26 billion. Clearly, the funds appropriated have been substantially less than that amount.

Senator NUNN. Thank you very much, Mr. Chairman. I appreciate Dr. Costello and General Abrahamson being here today.

We have a 3:30 p.m. briefing we have to go to on the Persian Gulf situation, so I will have to depart.

Senator EXON. I will recognize Senator Quayle in a moment. There will be some additional questions for the record for Dr. Costello and General Abrahamson, including the questions that were left earlier in the day by Senator Symms and others.

I would be glad to recognize Senator Quayle before we leave shortly for the 3:30 p.m. important briefing on the Persian Gulf affair.

Senator Quayle, do you have questions?

Senator QUAYLE. Yes. Thank you, Mr. Chairman.

I would like to welcome both of our witnesses.

ABM DECISION

Let me ask General Abrahamson this question. When in your judgment will we be confronted with an ABM decision either to move to the broad definition or to decide to withdraw from the treaty or cancel SDI as a program beyond research?

When do we get to that point? We are obviously not going to be there in the fiscal year 1989 budget. When do we get there?

General ABRAHAMSON. It is something that obviously we work very hard to keep to the right as far as possible so that it does not become an issue as it did last year. I think that was one of the most debilitating issues that the program has ever faced in the last year.

Senator QUAYLE. I agree. I think it was a very protracted and debilitating argument and had adverse impact on the program.

But at some time if we are going to deploy an SDI system rather than talk about it, you have to go to testing and development.

General ABRAHAMSON. That is correct.

Senator QUAYLE. It has to happen. Therefore, we are going to have an ABM decision. Either we say, well, we do have the broad definition or we will have to withdraw for national security reasons because we feel it is in our national security interest to deploy SDI.

I am just wondering at what point do you think that decision will come, in your judgment now, since it will not be a fiscal year 1989 decision? When do you think the Congress and administration will have to be faced with that decision?

General ABRAHAMSON. I believe that the actual tests that might be required that would be tests of the kind that it does not make sense or a great deal of sense or it is less cost effective just to continue to do these partial tests is somewhere out in the 1994-1995 time frame.

However, the hardware for those particular systems would have to be purchased earlier, and long lead investment would have to be made.

So at that pont it is certainly not in 1989, but it will come upon us somewhere early in the 1990s that we will have to face the question of what investment you put in those kinds of systems as opposed to actually conducting the tests. I think the tests are somewhere in the 1993-1994-1995 time frame.

Senator **Quayle**. So in your judgement, we will not have to face an ABM decision until 1993?

General **Abrahamson**. I believe that what we have done is we have tried to lay out the program just as effectively as possible to try to avoid having to have that issue.

One of the advantages of doing it that particular way is that what that allows you to do is to have a lot more confidence when you make that judgment.

Had we been able to proceed under the broad interpretation of the treaty, in our report to Congress last year what we indicated is that you would probably stay in the treaty for a longer period of time, and when that decision is made you could make it with higher confidence.

BROAD INTERPRETATION OF ABM TREATY

Senator **Quayle**. If, in fact, the Congress had accepted the broad interpretation of the ABM Treaty, which it did not, would you tell us how those tests would have been different?

General **Abrahamson**. We would certainly have gone back, reexamined some of our testing, and made changes to the program that you would have seen several years from now.

In my judgment, we would have been in a position then to have gotten that decision earlier. Some of the tests were outlined in our report to the Congress last year. Rather than doing an individual test, in some cases you would try to tie systems together and get as much system information as you can.

At this point, we are deferring that.

Senator **Quayle**. Would you have done anything differently had you had the broad interpretation?

General **Abrahamson**. In the very near term, probably not; however, probably not in the sense that we would not be able to have conducted a test immediately.

On the other hand, we might have started the investment in hardware so that you could conduct the test, and some of that investment would have occurred earlier.

Senator **Quayle**. So you would not have constructed Delta 180 or 181 any differently had you had the broad interpretation?

General **Abrahamson**. We passed the point on that particular experiment that we could have included an intercept or something of that particular kind long ago, Senator. That decision should or could have been made much earlier in order to effect that particular test.

DEPLOYMENT

Senator **Quayle**. When are you looking at a deployment date? Do you have one? What would it be as of now?

General **Abrahamson**. We indicated last year, and this was only a general kind of a recommendation, that we had hoped that with sufficient funding that we would be in a position so that you could make a national decision to go ahead in the early 1990s.

My view of what the early 1990s looked like was somewhere in 1991-1992-1993 time frame. I believe that that decision has now slipped approximately 2 years. At the very earliest it is 1993. It is more likely 1994, and that the development program which would come after that would be, at the minimum, approximately 3 years.

So we are talking about a slip for an initial deployment from the mid-1990s to 1997 or 1998.

Senator QUAYLE. But you are not recommending any particular system?

General ABRAHAMSON. That estimate is based on some of our Phase I systems as we presently envision them and as we have laid them out in the baseline.

Now, if we were able to find a simplification of some of these systems, that might affect these estimates. Remember, again, this is a research program, and I am always searching for a way to do it faster or more effectively and certainly to make it less expensive.

Senator QUAYLE. Mr. Chairman, my time is up.

I would ask unanimous consent that an article here concerning the SH-11 system and a possible breach of the ABM Treaty be inserted in the record.

Senator EXON. Without objection, it is so ordered.

[The information follows:]

USSR: General Denies SH-11 System Breaches ABM Treaty.

Moscow: Moscow NEWS in English No. 6, 7 Feb 88 p. 5.

[Major General Boris Surikov article: "Encroachment Upon The Truth: Washington TIMES Against SH-11"]

[Text] A few days ago, Washington Times published an article in which the author speculated on the development in the Soviet Union of an infrared tracking and homing system for new SH-11 ground-based interceptor missiles deployed in underground launching silos round the Soviet capital.

Let's leave to the paper's conscience and allegations that the Soviets are using the technology obtained in the USA by an agent of the Polish secret service. Such "facts" are chiefly meant for the US allies, who are being prompted to introduce ever new and rougher restrictions on goods exchange with socialist countries. Let's concentrate on the essence of the accusations made in the article.

Referring to American officials whose names are not mentioned, the paper alleges that the development of such a system is nothing, but a violation of the Soviet-American ABM Treaty inasmuch as this optical system is a violation of the ban, recorded in the ABM Treaty, on the use of systems based on other physical principles. This assertion is false.

I participated in the negotiations preparing the way for the ABM Treaty and can say with full responsibility that no designers' restrictions on permitted components of the ABM system, based on traditional interceptor missiles, have been imposed. The question of whether to use on interceptor missiles command guidance systems with radars applying homing devices or with optical-electronic devices (including those operating in infrared and ultraviolet ranges) was left to both sides to settle. *The questions of design were not and could not be the subject of negotiations on the limitation of ABM systems.* I think that even the former head of the American delegation at the Soviet-American talks on the SALT-1 Treaty could have vouched for this.

Just as futile is the attempt of WASHINGTON TIMES to outlaw the use of systems based on other physical principles. Statement as agreed upon by the sides, reads: "In order to ensure fulfillment of the obligation not to deploy ABM systems and their components except as provided in Article III of the Treaty, the Sides agree that even with the creation in the future of ABM systems based on other physical principles and including components capable of acting as substitutes for ABM interceptor missiles or of ABM launchers, or ABM radars, specific limitations on such systems and their components would be subject to discussion in accordance with Article XIII and the Article XIV agreement of the Treaty."

Thus, the *Soviet Union has the right to mount any guidance technologies* on new interceptor missiles without replacing the traditional interceptor missiles with weapons based on other physical principles (for example, Lasers). The procedure for introducing such technologies has been agreed upon by the sides and is being strictly observed.

Indeed, research and experimental design work is being carried out in the USSR to develop Moscow's ABM system further. However, the modernization and replacement of the ABM systems or their components are *allowed by Article VII* of the ABM Treaty.

This is well known to the American side. Then why did the paper need to whip up tension around the non-existent problem? The article it published answers this question. It shows, referring to a Washington official who preferred to remain incognito, that the tracking system for the SH-11 interceptor missiles was one of the causes behind the Joint Chiefs of Staff sending a letter to President Reagan warning him that he should not give his consent to the limitation of research and tests within the framework of SDI.

Hence, it is clear that the initiators of the publication in WASHINGTON TIMES needed their new venture only to add to the arsenal of "arguments" against observance of the ABM Treaty in the form it was, signed in 1972. At the same time, its aims were to undermine again the Soviet-American Treaty now being drawn up for a 50-percent reduction of strategic offensive weapons.

Senator **Quayle**. Thank you very much, Mr. Chairman.

Senator **Exon**. Thank you, Senator Quayle.

Thank you, Dr. Costello.

Thank you, General Abrahamson.

We are adjourned.

[Questions for the hearing record with answers supplied follow:]

Question Submitted by Senator John Glenn

FUNDS APPROPRIATED FOR SDI RESEARCH

Senator **Glenn**. Last year I drafted legislation that required that funds appropriated for SDI research be spent in the United States unless the Secretary of Defense certifies to the Congress in writing that the work to be performed under the contract "cannot be competently performed by a United States firm at a price equal to or less than" the price at which the RDT&E would be performed by a foreign firm. This legislation is now law and was incorporated into last year's DOD Authorization Act. Could you please tell me how the Department of Defense is implementing this legislation? How many overseas SDI contracts have been prohibited since this legislation has been passed?

General **Abrahamson**. We have drafted proposed procedures for the Defense Acquisition Regulation (DAR) Council to use as a basis for permanent language to be included in the DAR. In the meantime, we are providing proposed procedures to agents to serve as interim guidance. The following contracting activity has occurred since your legislation passed:

a. Three contracts have been awarded overseas;

b. No overseas contract awards have been prohibited specifically because of Public Law 100-180, Section 222;

c. No foreign contracts have been awarded because "the contract is to be performed in the United States," exception (c)(1);

d. Two of the overseas contracts (for the Invite, Show and Test Program) were awarded to foreign firms because "the contract is exclusively for research, development, test, or evaluation in connection with antitactical ballistic missile systems,"

e. One overseas contract was awarded under the provision of subsection (b). This is a contract with the United Kingdom Ministry of Defense for research on High Operating Temperature (HOT) infrared detectors. Cost and competency information for this award will be provided in my written certification as required by the Public Law;

f. No contracts have been awarded because a "foreign government or foreign firm agrees to share a substantial portion of the total contract cost," exception (c)(3). However, prior to and independent of this Public Law, and agreement on hypervelocity launcher (rail gun) research was concluded with the Netherlands. The agreement calls for a United States contribution of five million dollars and a Dutch contribution of seven million dollars. In addition, we are in consultation with four allied governments concerning potential jointly-funded research projects. It is expected that the cost sharing in future cooperative agreements will vary from case-to-case depending on the circumstances. In no case, however, will an agreement be concluded where the allied government makes only a "token" contribution.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

ACCIDENTAL LAUNCH SYSTEM OPTIONS

Senator THURMOND. Are you able to state any preliminary observations at this time about the relationship between accidental launch system options and the technologies in the baseline Phase I architecture? Are there likely to be any accidental approaches not included in the six Phase I technologies?

General ABRAHAMSON. It is premature to state positively the architecture for an "accidental" launch, limited protection system (LPS). The path to a complete strategic defense capability would certainly include an LPS capability.

In general, the technologies being developed for Phase I would probably include those needed for LPS. As an exception, one option for LPS could include a high endoatmospheric interceptor (HEDI) which is not one of the Phase I technologies, but is a part of the total SDI research program. Our plans for Phase I continue to be refined.

EFFECT OF BUDGET REDUCTIONS

Senator THURMOND. How would further budget reductions in fiscal year 1989 affect the balance between Phase I and long term technologies?

General ABRAHAMSON. In the allocation of appropriated funds we have consistently strived to maintain a balance between the most mature technologies and advanced technologies. This is an essential research approach to an effective, robust Strategic Defense System and we expect to maintain such a balance in the future. However, the overall level of funding for the research is critical. Past reductions from requested budgets resulted in delays in progress in both the mature and the advanced technologies. We restructured our complete SDI program and our fiscal year 1989 budget request in accordance with agreed defense budget totals by reducing the 1989 request $1.7 billion but maintained a balanced program. We desire to maintain a balance in fiscal year 1989.

FAR-TERM TECHNOLOGY EFFORTS

Senator THURMOND. Would you describe for the subcommittee how the far-term technology efforts will parallel the decision process related to Phase I technologies?

General ABRAHAMSON. A significant aspect of the SDI research program is the distinct relationship between an initial and subsequent phases of a Strategic Defense System (SDS). The relationship has been formalized by the Under Secretary of Defense for Acquisition. Specifically, subsequent progress of the Phase I SDS through the Defense Acquisition Process must be accompanied by similar progress of follow-on technologies. In order words, as the initial phase SDS approaches Milestone II of the process, the follow-on phase technologies must successfully complete a Phase I review.

IMPACT OF BUDGET REDUCTIONS

Senator THURMOND. What has been the cumulative effect of budget reductions taken to date on the schedule by which a full-scale development decision could be made, and the confidence he will have in the data supporting that decision?

General ABRAHAMSON. Large budget reductions from the fiscal year 1985, 1986, and 1987 requested levels caused a reduction in the number of promising technologies being pursued in parallel and increased the difficulty of realizing adequate solutions to specific technical issues. Further significant reductions made in fiscal year 1988 placed the SDI program in a position where simply scaling back alternatives was no longer viable. The difference between the requested and appropriated levels each year has been so large that it has had a substantial and increasingly detrimental impact on the program. Specifically, the progress in some portions of the program has been slowed approximately 1 to 2 years. Progress on technologies needed to hedge against possible Soviet countermeasures has been slowed. We have had to reduce the rate of investment in pursuit of innovation and focus on technologies that could be used to sustain performance growth to increasing levels of defense. The reductions have lengthened the time schedule when a decision whether to deploy effective defenses might be made.

SPACE-BASED EXPERIMENT

Senator **Thurmond**. Has it been determined that a space based experiment is essential to establish the feasibility of space base directed energy concepts for follow-on phases?

General **Abrahamson**. Yes, space testing is essential in demonstrating the feasibility of these space based directed energy concepts. Such experiments are planned for all of our major space-based DEW programs.

SYSTEM ENGINEERING AND INTEGRATION CONTRACT

Senator **Thurmond**. What is the purpose of the System Engineering and Integration Contract and what have been the ground rules of the competition for this contract?

General **Abrahamson**. The System Engineering and Integration (SE&I) contract is structured to provide an industry integration team as a strong centralized Systems Engineering effort for the technologies selected as the planning baseline for the SDS Phase I. Included in the contractor's responsibility are overall system performance and design of the Battle Management function of the system.

General Electric was selected as the SE&I contractor. The government conducted as full and open a competition as possible to afford all qualified sources the opportunity to compete. We realized that with many system element prime contractors, actual and perceived Organizational Conflict of Interest (OCI) could arise during the performance of the contract unless provisions were established prior to award to eliminate or mitigate any conflict. In order to promote objectivity to the maximum extent possible, Phase I element prime contractors and the NTB prime contractor were excluded from performing as the SE&I prime contractor. Element primes may be subcontractors, providing they are not placed in a position of making design/development decisions relating to equipment or systems that they provide. Current BM Experimental Version contractors were not subject to the prime exclusion. No restriction applied to the Advanced Launch System (ALS) which is primarily a transportation system for SDA with few functional interfaces. It was recognized that individual contractor's situations differ widely and many decisions could be taken to eliminate or mitigate potential OCI issues. Thus, any offeror eliminated by the exclusion was invited, at their option, to propose alternative and specific solutions to the OCI issue as it related to his situations and plans.

SDI PROGRAM

Senator **Thurmond**. Secretary Costello and General Abrahamson, what benefits accrue to the SDI program from its inclusion in the normal Department of Defense Acquisition Review Process?

Secretary **Costello**. There are many benefits to the SDI program from its inclusion in the Defense Acquisition Review process. A number of significant ones are as follows:

(1) Establishes a program baseline and acquisition strategy.

(2) Enhances program stability, e.g., requiring meaningful, realistic long range planning.

(3) Formalizes military, survivability, and cost effectiveness requirements for the Strategic Defense System and measures SDIO's progress toward meeting these requirements.

(4) Provides a structured review of the program by a broad technical community.

SDI EXPERIMENT LEGISLATION

Senator **Thurmond**. Since you and Mr. Costello have guaranteed this committee that there is no SDI experiment in fiscal year 1989 that goes beyond the requirements of section 225 of last year's Authorization Act, is there any reason for the Congress to pass similar language this year?

General **Abrahamson**. No. As you point out, there is no experiment in fiscal year 1989 that goes beyond the restrictive interpretation of the ABM Treaty. Further, the administration has consistently stated that any change from that position would result only after consultations with Congress. Legislation similar to last year's is therefore unnecessary. Moreover, any such legislation would undercut our broader arms reduction efforts by seeming to advocate unilateral concessions to Soviet positions while negotiations are ongoing.

ABM TREATY

Senator **Thurmond**. Would such legislation perpetuate a condition of unequal compliance with the ABM Treaty since the Soviet Union is not bound by such a unilateral understanding?

General **Abrahamson**. Yes, During the negotiation of the ABM Treaty, the Soviets refused to accept any prohibition in the treaty on the development and testing of ABM systems based on "other physical principles." Consequently, the Soviets have not bound themselves to the so-called restrictive interpretation of the treaty. Passing legislation such as Section 225 of last year's Authorization Act would unilaterally constrain the United States and adversely affect our national interests.

ARMS CONTROL IMPACT STATEMENT

Senator **Thurmond**. When do you think the United States will find it necessary to begin testing under its full legal rights of the ABM Treaty as described in the fiscal year 1989 Arms Control Impact Statement?

General **Abrahamson**. SDI tests and simulations are designed to address significant issues associated with strategic defenses and develop information necessary to a decision regarding full-scale development. Integrated tests involving all elements will be necessary for a fully confident national decision on full-scale development of Phase I of a Strategic Defense System. These tests would require the broad interpretation.

ABM TREATY REVIEW

Senator **Thurmond**. How does the administration expect to handle the 5-year ABM Treaty review with the Soviet Union? What is the administration's position? Does the administration plan to consult with the Senate before entering into the 5-year review with the Soviet Union?

General **Abrahamson**. The ABM Treaty review process is complicated by the existence of two violations of the ABM Treaty—the illegal deployment of a Flat Twin ABM radar and a Pawn Shop van (both components of an ABM system) outside a permitted ABM system deployment area or designated ABM test range, and the construction of the radar near Krasnoyarsk whose associated siting, orientation and capability is prohibited by this treaty. The administration has not yet completed this process.

RESTRAINTS ON TESTING

Senator **Thurmond**. Is it prudent to continue to prohibit long-lead time testing on promising programs since the Soviet Union is under no similar restraints and in fact has been engaged in a massive strategic defense program since the signing of the ABM Treaty?

General **Abrahamson**. As a rule, unilateral arms control restrictions are not prudent. If the United States is to make a fully informed decision on the feasibility of effective strategic defenses, we will have to conduct experiments, under the legally correct interpretation of the treaty, to demonstrate the effectiveness of advanced technologies in destroying ballistic missiles in flight trajectory. As the requirement to conduct fully capable and realistic tests approaches and we have defined an experiment to satisfy these requirements fully, we plan to consult closely with the Congress before taking a decision to proceed.

Questions Submitted by Senator Steven D. Symms

INDUSTRIAL CONTRACTS ON NUCLEAR MEGAWATT PROGRAM

Senator **Symms**. General, you and I have talked about the possibility that you might have to deobligate on contracts already awarded for a project at the Idaho National Engineering Laboratory. Are you having to take such drastic actions as a result of the proposed reductions put forth by the House Armed Services Committee?

General **Abrahamson**. As a result of a careful review of our budget activities, we will be able to support the six industrial contracts on the nuclear megawatt program.

Senator **Symms**. What is the impact of such deobligation—to the laboratories and contractors and the SDIO; i.e. penalty charges, the possibility that a contract will sue for costs, loss of credibility?

General **Abrahamson**. As we do not plan to cancel the procurement, there will be no impacts such as you describe.

SDI PROGRAM

Senator **Symms**. I keep hearing here in Congress that you have tilted the SDI program in a direction that will lead to near term deployment. I have looked at the budget and it seems to me you have a good balance between near and long term research. Tell me, General, do you think this criticism is justified?

General **Abrahamson**. No. We have consistently assured that the research program maintains a proper balance between mature and far term technologies. Our budget allocation plan, based upon the requested funding for fiscal year 1989, follows:

[In percent]

Technology	Fiscal year—	
	1988	1989
Phase I	14	14
Both	48	36
Far Term	38	50

[Whereupon, at 3:35 p.m., the hearing adjourned.]

INDEX

A

Page

- ABM 134
  - Decision 723
  - Deployment 233
  - Radar 181
  - Systems compliant with the ABM Treaty 145
  - Technology, changes in 234, 235, 236
- ABM Treaty 227, 729
  - Broad interpretation 724
  - Compliant strategic defense system 100
  - Compliant system, cost of 231
  - Review 729
- Accidential launch system options 727
- Advanced launch system (ALS) funding 311
- Agent VX, stability of 595
- Air defense and ATBM 103
- Aircraft:
  - Carriers 138
  - Shelters 32
- ALPS:
  - Configurations cost effectiveness 168
  - Deployment at Grand Forks 150, 166
    - Summary 158
  - Deployment, limited, benefit of treaty 178
  - Expanded coastal deployment 169
  - Expanded deployment for 160
  - HEDI coastal defense for 162
  - Interceptor life cycle cost 185
  - Master schedule 184
  - Mission 147, 165
  - Summary 164, 170
  - Threat 148, 165
- ALQ-161:
  - Flight test program 660
  - Test schedule 656, 662
- ALS program 315
  - Congressional funding limitations 322
  - Cost sharing 320
  - Development and cost 315
  - Funding profile 311
  - Goals 322
  - Ground operations 312
  - Integrated technology plan 277
  - Management plan 312
  - Participation by Federal facilities 317
  - Unique civil requirements 312
- Analytical support 507
- Arms control 373, 388
  - DOE's role in 530
  - Impact statement 729
- Artillery-filled atomic projectiles 25

Page

- Artillery shells, nuclear 9
- ATACMs 27
- Attack corridors 149, 166
- Attack preparedness, compromise, "dual use" 641
- Attack preparedness exercises, reluctance to participate in 628

B

- B-1 138
  - Avionics 673
- B-1B 130
  - Capabilities demonstrated:
    - Air vehicle 652
    - Defensive 656
    - Offensive 653, 654
    - Weapons 662
  - Defensive systems program 655
  - Development program 659
  - Modifications 660
  - Speed of 657
  - Test plan and program 645
  - Test remaining offensive 655
  - Test remaining weapons 663
  - Test status 649
  - Testing program 658
- B-2 ..... 131, 138
- Ballistic missile defense (BMD) 230
  - Deployment, two-sided 101, 102
- Ballistic missiles, ability to penetrate Soviet defenses 99
- Bigeye 561, 570
  - Production 575
  - Testing program 572
  - Tests 573
- Binary munitions, producing 567
- Binary reliability 574
- "Bolt out of the blue" 627
  - Attack 113, 633
- Bombs into combat stockpiles 571
- Bonuses 141
- Booster failure and assured access 312
- Booster performance enhancements 312
- Bow wave, Defense 355
- BSTS program tests 690
- Budget 489
  - Issues 539
  - Priorities, highest 629
  - Problem, size and scope of 346
  - Reductions:
    - Effect of 727
    - Impact of 727
  - Request 360
    - Fiscal year 1989 441
  - Summit, Defense 515
  - Trends 330, 364
- Building 371 renovation 537

C

Page

- CAIG:
  - Cost estimates ... 693
  - Cost estimating process ... 699
  - Capability assurance strategy ... 422
- Central Training Academy ... 482, 492
  - Chemical disposal, on-site ... 593
- Chemical warfare and chemical and biological defense program:
  - Bigeye ... 561
  - Binary chemical warhead, MLRS ... 564
  - Chemical projectile, binary, 155mm ... 560
  - Defensive program ... 555
  - Destruction program ... 565
  - Retaliatory program ... 559
  - Chemical weapons in Afghanistan ... 569
- Chemical weapons modernization and demilitarization program ... 545
  - Chemical and biological ... 592
- Civil defense ... 597
  - Budgets, expansion of ... 640
  - Education ... 629
  - Emergency, cooperation during ... 640
  - Soviet commitment to ... 63
  - Surge actions ... 639, 642
- Civil Defense Act ... 638
- Clean up ... 346
- Comprehensive cooperation agreement ... 631, 636, 640
- Computer security program, classified ... 486
- Congress, role of ... 24
- Congressional request, fiscal year 1989 ... 362, 375
- CORE program ... 398, 444
- Corporate planning and programming ... 481
- Cruise missile numbers ... 659
- Cryofracture technology ... 594

D

- Defense:
  - Assistant Secretary of ... 356
  - Budget summit ... 515
  - Concept, forward ... 16
  - Non-discretionary spending increases ... 301
  - Programs:
    - Agenda, current ... 365
    - Funding ... 361, 368
    - Missions ... 357, 358
  - Technologies, advanced ... 59
- Demilitarization facilities ... 589
- Department of Energy (DOE):
  - Accomplishments ... 371
  - Atomic energy defense activities ... 327
  - Bow wave ... 355
  - Funding request ... 373
  - Mission ... 370
  - Mission and U.S. National security strategy ... 385
- Deployment ... 724
- Developmental money ... 19
- Dichloride staff at Pine Bluff ... 575
- Disposal methods, advantages and disadvantages ... 594
- Document control initiative, classified ... 485
- DSCS launch costs ... 321
- Dual agency status ... 341

E

- Early warning system ... 180
- Education program for community ... 584
- Electronic warfare capabilities, baseline ... 659

Page

Emergency Broadcast System ... 626
Emergency Operating Centers (EOC) ... 642
Emergency response program ... 402
Energy Research Advisory Board (ERAB) ... 353
    Panel on new production reactor technology assessment ... 353
Engineering costs, full scale, phase I ... 718
Environment and safety ... 352
Environment, safety and health ... 425, 450, 533
    Activities ... 363
Environmental:
    Cleanup, cost of ... 536
    Legislation ... 363
    Protection ... 426
    Restoration ... 462, 463
    Safety and health funding ... 364
ERIS (exoatmospheric reentry interceptor subsystem):
    Communication system ... 181
Early warning radars ... 191
    System ... 231
ERIS and HEDI systems ... 235
ERIS/ALPS treaty limited ... 173
ERIS FTV:
    Missile ... 229
    Program ... 174
ERIS FTV versus ALPS ... 175

F

Facilities capability assurance program ... 423
Facility initiatives ... 367
FEMA:
    Funding increase ... 635
    Highest priority funding ... 639
Fernald Plant ... 539
First strike, Soviet ... 232
Fiscal constraints and arms control ... 124
Flexible response ... 33
Follow-on forces atack ... 17
Force, balance of, what it is ... 110
Funding:
    Issues ... 520
    Levels ... 540
Fusion, inertial ... 406
Future scenarios, the 2010 study ... 538

G

Grand Forks:
    ALPS development summary ... 168
    Deployment, cost for ... 153, 167
    System at ... 171

H

High Endoatmospheric Defense Interceptor (HEDI):
    ALPS deployment schedule ... 163
    Coastal defense for ALPS ... 170
    Early deployment schedule ... 170
Human reliability program ... 488
Hypervelocity projectiles ... 404

I

ICBM:
    Modernization programs ... 237, 238
    Threat, defended footprint ... 179
Inertial fusion ... 406
    Program ... 517
INF strategy, post ... 25

Page

- INF Treaty ... 534
  - Cutbacks in spending ... 102
  - Weapon systems affected by ... 39
- Initiatives ... 481, 509
  - Facility ... 367
  - Management, classification ... 489
  - Modernization ... 11
  - Visits and assignments ... 484
- International safeguards ... 496
- IOC of Small missile ... 255
- Isotope isolation, special ... 338

J

- JCS requirements ... 79

K

- KC-135 re-engining ... 133
- Kill vehicle assembly ... 176
- Kinetic kill weapon, space-based ... 91

L

- LANCE, follow-on to ... 18
- Launch:
  - Accidental:
    - Defense against ... 58
    - Protection system ... 96, 102, 214, 230
  - Advanced system ... 101
  - Complex requirements ... 320
  - Mission model, DOD, projected ... 274
  - Pads, justification for ... 309
  - Pads and boosters ... 288
  - Policy, National ... 269
  - Program, advanced ... 324
  - Recovery plans, DOD ... 322
  - System continuation, advanced ... 325
  - Vehicle
    - Assets, current ... 271
    - For commercial satellites, assessment of ... 310
    - Strategy ... 270
    - Midterm ... 272
  - Vehicles/launch sites ... 321
  - Vehicle/operational payload assignments ... 273
- Leakers at existing stock piles ... 589
- Lightsat program development ... 323
- LWIR probe configuration ... 184

M

- Management initiatives ... 427
  - Classification ... 489
- Master safeguards and security agreements ... 493
- Midgetman ... 83
- Midgetman and SDI, difference between ... 84
- Milestone II, arriving at ... 82
- Milestones, fiscal year 1988-89 ... 410
- Minuteman SICBM ... 132
- Missile: ...
  - Command and control systems ... 233
  - Defense, ballistic ... 230
  - Forces, submarine ... 135
  - Guidance system ... 239
  - Systems, strategic, advanced ... 263
- MLV II costs ... 314
- Mobility, deception, and concealment ... 252
- Modernization: ...
  - Acceptance of ... 35

Page

Modernization—Continued
  Commitments, immediate 11
  Initiatives 11
  Study 510, 521
Modernized systems, survivability of 30
Montebello decision 7
MSR site, Grand Forks 182
Munitions, leaking 591
MX:
  Rail garrison 262
    Funding 260
    Revised cost estimates 260
  Survivability, rail-garrison 258
  Train locations 262
MX versus Small ICBM 256

N

N Reactor 435
  Budget request for fiscal year 1989 515
NAS (National Academy of Sciences):
  reactor assessment 437
  Recommendations 517
NASA:
  Budget crisis 324
  Non-DOD manifest 325
NASP (National Aero-Space Plan):
  Program costs 303
  Resources summary 316
National aerospace plane 324
  Flight schedule 314
  Funding 311
  Indirect costs 313
  Schedule/priority 323
National assets 231
National defense policy:
  Issues 394
  Issues and program responses 388
National military strategy 119
NATO nuclear posture 26
Naval reactors support 455
New Brunswick laboratory 493
New production reactor (NPR) 453
  Selection process 520
New Savannah River Plant operating contractor 455
Nuclear:
  Artillery shells 9
    155mm 35
  Competence, the fundamental response 387
  Directed energy weapons 402, 403
  Deterrence, continuing requirement for 386
  Materials:
    Complex study 519
    Control and accountability 483
    Management and safeguards system 492
    Megawatt program, industrial contracts on 729
    Office of 433
    Production 379, 434, 438
    Requirements 524, 541
    Requirements, residue recovery 539
    Supply 391, 521
    Safeguards and security 480
    Safety 426
    Submarine technology 22
    Testing 513
    Testing, potential additional restrictions on underground 390
    Testing trends 377

Nuclear—Continued
  Materials—Continued
    Page
    Tipping ATACM 29
    Weapons complex, modernizing 347, 366

O

Operations mission model 245
Optical frequency lasers 404
Outyear progress 642

P

Peacekeeper missile 132, 134
  In Minuteman silos 239, 240
  Rail garrison 241
Penaids 260
Phase I:
  (BMD) 100
  Cost of 716
  Full-scale development of 100
  SDI deployment 718
  SDS deployment 101
Phenomenology discrimination, probe/radar dual 183
Pilot retention 141
Pilot shortage, airline 143
Plutomium 338, 437
Polar world, multi 92
Preparedness, emergency 595, 596
Problems with aging complex 535
Processing operations 446
Production and surveillance 411
Production goals, factors affecting 538
Production reactors, new 522, 541
Projectiles, hypervelocity 404

R

Radar:
  Battle management 228
  Early warning 191
Radiological:
  Defense funding 634
  Emergencies 641
Rail traffic control 253
Reactor:
  New 343
  Production, new 339, 351
  Safety issues 516
  Study 350
Rebaseline ground rules 251
Repository fee 476
Research, development, and testing, programmatic projects 425
Resource allocation, fiscal year 1989 700
Restoration and retention 447
Retaliation, U.S. 232
Rocket motor, solid, advanced 325
Rocky Flats, population density 536

S

SA-12 134
SAC:
  And the future, conclusion 129
  Retention rate 139
Safeguards and security 429, 452
  Activities, Defense programs 362, 363
  Commitment to 383
  Crosscut 499
  Operations 490
Savannah River Plant Reactors 445

Page
SBKKV program 228
Security:
  Affairs 382, 479
  Inspectors, physical fitness for 483
  Investigations 498
  Program, personnel 487
Seismic monitoring research 532
Shuttle C 324
Shuttle flights 303
  Scheduled 317
SLBM threat:
  Coastal targets vulnerable 161, 169
  Defended footprint 180
Small ICBM 132, 254, 261
  Advanced guidance system 263
  Contract option 263
  Costs 262
  Flight test 263
  Funding 262
  Mirving 261
  Test 261
Small ICBM and hard mobile launcher 249, 250
Small missile, funds spent on 260
Soviet:
  Anti-ballistic system 133
  Breakout 67
  Chemical potential 568
  Commitment to civil defense 63
  Countermeasures 694
  First strike 232
  Military threat 108
  Strategic defense, assessing 196
  Submarine force 228, 229
Space:
  Boosters funding 278
  Industry, investment in commmercial 321
  Policy review 317
  Transportation systems 276
Space-based:
  Experiment 728
  Interceptors 692, 694
  Kinetic kill weapon 91
Space launch:
  Program and policy, Air Force, revised 265
  Recovery 280
  Roadmap 268
Special isotope separation (SIS) 449, 513
  Plant 525
  Plant and alternate sources of plutonium 527
  Technology and nonproliferation concerns 526
SR-71 133
SRAM II 45
SS-18 100
  Force 96
START 40, 130
  Agreement, budget impacts 264
  Assumptions 115
  Effect of 50 percent cut 232
  Reduces U.S. warheads 99
  Support of 137
  Verification under 254
State and local compliance 641
States of agreement 635
Stockpile:
  Maintenance 415
  Storage 578
Strategic:
  Defenses 136

Strategic—Continued Page

- Defense research 390
- Defense, Soviet, assessing 196
- Defense, system, phase I 95
- Deterrence 105
- Missile systems, advanced 263
- Warning capabilities 264

Strategic Defense Initiative (SDI) 51, 540

- Current system 229
- Experiment legislation 728
- Funding levels for 102
- Managment authority 686
- Pace and direction 677
- Phase I 137
  - Costs 698
- Program 193, 225, 721, 728, 730
- Research, funds appropriated for 726
- Research, spending caps for 103
- Shuttle flights for 309
- Support for 137
- Tests 688, 689

Submarine:

- Force, Soviet 228, 229
- Missile forces 135
- Technology, nuclear 22

Submarines, nuclear-power attack class 340

- Survivability measures 628

System engineering and integration contract 728

T

Tactical nuclear modernization 43

- Budget request for 12

Tactical nuclear systems, short-range, criticism of 44

Targets along coast 231

Technical surveillance countermeasures program 484

Technologies, Defense, advanced 59

Technology:

- Detection 504
- Efforts, far-term 727
- Verification 343
- Verification and control 500

Technology and development 494

Technology Assessment, Office 291

Test-ban readiness program 532

Testing, restraints on 729

Third zero and modernization 13

Third zero option 21, 36

Threat assumptions 177

Threat track/intercept timeline 190

Titan IV:

- Booster production limitations 307
- Pad costing 305
- Pad schedule 305
- Payloan upgrade 313
- Payloads and launch schedule 309
- Payloads, shifting to the shuttle 307
- Production capacity 307
- Production requirements 320

Transportation management 475

Treaty compliance 226

Treaty option, modified 187

- Defended footprints 188

Triad 130

Tritium 436

Two layers, dual phenomenology increase effectiveness 152, 167

U

Page

- Uranium:
  - Highly enriched 437
  - Requirements, enriched 540

V

- Vandenberg:
  - Second pad justification 308
  - Shuttle pad 306
    - Funding 306
    - Modifications 307
    - Uses 306
- VX, agent, stability of 595

W

- Warning capabilities, strategic 264
- Waste:
  - Compliance technology program, hazardous 474
  - Inventories, radioactive 458, 459
    - High level waste 459
    - Low-level waste 459
    - Radioactive waste types 458
    - Transuranic waste 459
  - Isolation pilot plant 468
  - Isolation plant project 518
  - Operations and projects 465
  - Processing facility, Defense 466
  - Research and development 471
    - Hazardous 474
  - Technology:
    - High-level 472
    - Low-level 473
    - Transuranic 472
- Waste and environmental restoration, Defense 308, 456, 457, 461
- Waste and transportation management, Defense 460
- Waste vitrification plant (HWVP), Hanford 470
- Weapons:
  - Activities, major accomplishments 395
  - Builds/deliveries and stockpile improvement 412
  - Complex, maintaining the 393, 420
  - Complex, nuclear, modernizing 347, 366
  - Development, testing and production and nuclear materials sites 359, 374
  - In production 378
  - Nuclear energy directed 402, 403
  - Production and surveillance 377
  - Research, development and testing 376, 397
  - Strategic 232
  - Systems 32
  - Systems affected by the INF Treaty 39
- WIPP:
  - Research and development 473
  - Roads 539

X

- X-ray lasers 404

Z

- Zenith Star program 696
  - Chemical laser experiment 691
- Zenith Star and BSTS experiments 688
- Zero-zero option 21

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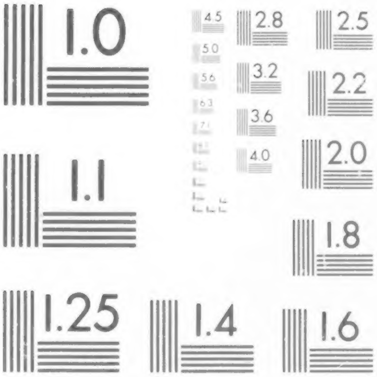
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